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electron

user

Vol. 3 No. 6 March 1986 £1

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[illegible]

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Don't miss the biggest money-saving offer we've ever made. You'll find full details in the centre pages.

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The Daily Scoop

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electron NEWS

Repton 2 collects award

STRATEGIC treasure hunt - cum - jigsaw puzzle Repton 2 from Superior Software - which is available for both the Electron and the BBC Micro - has won the title 1985 BBC Game of the Year.

The award was decided by a poll of readers of Computer Gamer magazine and presented at a ceremony held at the Regents Palace Hotel, London.

Repton 2, which features in a special subscription offer in this month's issue of *Electron User*, beat *Revs* from Acorn-soft into second place in a close-run race.

Third was *Knight Lore* from Ultimate.

Disc book

A FREE 70-page handbook describing its disc drive operating system for the Electron has been published by Cumana.

The publication covers detailed technical information, all operating procedures and functions, from data storage through to fitting an additional ROM.

Electron owners can obtain a copy by writing to Cumana Limited, Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH.

Interface opens up software range for Electron

A DRAMATIC breakthrough on the Electron front has opened up the machine to "a vast pool" of disc based software currently restricted to the BBC Micro range.

In all several hundred titles are involved, including many of the leading educational programs available in the UK.

All this is due to Advanced Computer Products going into production with an Electron disc interface. Known as the AP4, it will feature 1770DFS as standard running with page at E00.

Priced in the region of £70 - the price has still to be settled - the interface will allow the transfer of files between systems. This includes not only tape to disc but

DFS to ADFS and vice versa.

"One of the main complaints from Electron users has always been the lack of good software around", says John Huddleston of ACP. "Now the AP4 will change all that".

Advanced Computer Products adds another new product to its range to supplement the Advanced Disc Toolkit.

The Advanced ROM Manager gives user ability to handle ROMs in ROM filing system.

Priced at £20, it allows users to run their own software from side-

ways ROM

Acorn's second processor to be connected to the Electron, so providing a major boost in speed. It will also create additional memory - some 40k in Basic usable RAM and more than 60k machine code.

Meanwhile ACP has added another new product to its range to supplement the Advanced Disc Toolkit.

The Advanced ROM Manager gives user ability to handle ROMs in ROM filing system.

Priced at £20, it allows users to run their own software from side-

The Tube will allow

The mouse is coming!

THE new AP5 interface (see main story) will allow Electron users for the first time to enjoy the advantages of the critically acclaimed AMX Mouse.

Such was the success of the original mouse for the BBC Micro that it sold 10,000 units in the first nine months alone.

Now the opto mechanical device from Advanced Memory Systems will offer Electron users what its manufacturers describe

as "an entirely new approach to computing that makes the keyboard seem almost old fashioned".

The AP5 will also allow the Electron to run AMX Art. This is a computer-aided drawing program utilising on-screen windows, icons, pull-down menus and pointers for producing professional standard drawings or mere doodles that can be saved and printed.

BATTLE OVER MEXICO

SOFTWARE publisher Malcolm Howard is fighting off an attempt to suppress his World Cup football management simulation for the Electron, Mexico '86.

Leading games manufacturer US Gold feels it has sole rights to the title due to a licensing deal with FIFA, the world football ruling body and organisers of the World Cup finals.

Solicitors for US Gold recently wrote to Howard's company, Qual-Soft, stating their objection to the mail order firm's use of the title.

But Qual-Soft has been marketing its Mexico '86 game for nine months, and Howard says he sees no reason to give up the title.

"The official FIFA logo with the words Mexico '86 has been registered but never published, so it is not in force according to our legal advisors", Howard told *Electron User*.

A COMBAT READY PHANTOM II WILL COST YOU £14m

"Well produced and technically good futuristic combat flight simulation featuring some of the best and smoothest 3D graphics I've come across on the Beeb." —

Computer Trade Weekly

RATED 8 OUT OF 10 FOR QUALITY, GRAPHICS, PLAYABILITY & VALUE!



RAF
PHANTOM PILOT
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COURTINAGE
"PHANTOM COMBAT"
"MARVELLOUS... QUITE
EXCELLENT... BEST MICRO
FLIGHT SIMULATION I'VE
EVER SEEN... TOTALLY
CAPTIVATING!!"
— Flight International

More than 'just' a very fast full-flight Simulator 'Phantom Combat' offers the excitement and energy of 1500 mph air to air combat in high resolution 3D colour graphics. This 100% machine code package has been written by a military flight simulator software engineer together with the B.A. captain who wrote the best selling '747' simulator for Doctor Soft.

A SIMULATOR INSIDE A SIMULATOR

In one of the training modes (simulation mode) FORM is actually possible to fly the Phantom AND control the Enemy aircraft which can be clearly seen flying in 3D outside your fully equipped cockpit. Alternatively, a friend can pilot the enemy on separate keys while you attack.

THE ADVERSARY

Now, at last, enemy aircraft are NOT shown as arcade 'sides', they are computer drawn, navigated and 'flown' at a smooth 15 Frames per second. The delta outlines reflect Soviet Mig 21 (Fishbed) 95m 15 (Flagon) performance. In combat mode (CBAT) they fight back, intelligent and dangerous.

INSIDE

Instrumentation is comprehensive with a wealth of clear and precise displays, featuring both analogue and digital readouts, or speed in knots as shown on a dial AND digitally, with a separate Mach number display; radar computed target range altitude and bearing shown; target pointer and gunights military 'Tacan' navigation (factual air navigation) etc.

'OUTSIDE'

Externally views include Horizon, other aircraft, a network of ground detail points, separate landing runways and animated 'strobe' approach lighting. NO 'chunky' models, all objects are drawn in fine, high resolution coloured lines. The view is recomputed and redrawn 15 times every second.

AIR TO AIR COMBAT

Warning! There are no 'lives' but your single fire, your score is scored and the program restarted if you are shot down or crash. This motivates you to try and 'bring home' a damaged aircraft. May different forms of damage can occur. Most are survivable, or a gear up runway landing if smooth enough. If you can't land, use the EJECTION seat and survive.

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3rd generation flight software by Nick Brown and Roger Selby

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**BBC 32K
ELECTRON versions**

Electron takes over parish paperwork

MINISTERING unaided to a parish of about 15,000 people near Mansfield, Nottinghamshire, makes every day a busy one for the Rev Robin Walford.

But he has been able to cut the job down to manageable size since he bought an Electron 18 months ago.

Like his colleague down the road in Nottingham, the Rev Leslie Cowley, whose story was carried in last month's *Electron User*, he finds a computer takes a lot of the strain out of parish paperwork.

Priest-in-charge of St Alban the Martyr in the mining community of Forest Town, Mr Walford's conversion to serious computing with the Electron has been a gradual process.

He said: "I discovered the Electron shortly after I arrived in

the parish and bought it with the intention of playing games and with some vague ideas of using it for administration.

"The games quickly palled, but my Electron didn't, and I have gradually developed my usage as well as the equipment over the time.

"In order to cope single handed with my workload I'm required to be very efficient in my administration and ministry, and my Electron plays a big part in this.

"My use of the machine falls into two main areas, word processing and database.

"My use of View is continually growing and what a blessing it is.

"All my correspondence is produced this way and I store on disc all of the standard forms for baptism and marriage, banns certificates,



Rev Robin's Electron takes the strain

deeds of covenant, and application for permission to videotape wedding services.

"I use macro letters to write to, say, all the users of the church hall about some matter, in conjunction with the database to write to bereaved relatives on the anniversary of the death of their loved one, and to send encouraging notes to church members who have fallen by the wayside.

"I also store and reproduce various hand-

outs which I use for courses I run and produce the various rotas for church duties.

"On my database I keep the church electoral roll, bereavement contacts, baptism contacts and names and addresses of those who covenant to our church.

"I have not yet got round to using Viewsheets, but have in mind its application in budgeting, balance sheets and covenants.

"My use of the Electron continually grows".

Aussies like our cricket

RETURNING to its originators like a boomerang is Australian best seller Arnie's Armchair Cricket.

North East software house Tynesoft bought the rights to convert the game for the Electron and retitled it Ian Botham's Test Match.

But the Australians - who did not have their own Electron version - liked the conversion so much they bought the rights to set it back Down Under.

Tynesoft's version of the cricket simulation game is now on sale in the UK, price £9.95. It is one of its three new releases.

The game has a choice of one or two players and selected number of overs, one day or test match. The user also has a choice of players, their strengths, positions and speed of play or can ask the computer to preselect them.

An Electron conversion of the classic arcade games Jet Set Willy and Rig Attack, are the company's other two releases. They cost £7.95 and £5.95 respectively.

More from Ribbon

BUDGET software specialist Blue Ribbon has added two new programs for the Electron to its range.

The first, Astro Plumber, has the user flying around the screen trying to seal leaks before either the air supply runs out or he is captured by cavern dwellers.

In the second - Diamond Mine II - the user is sent scurrying underground to collect as many of the precious stones as possible.

Both games cost £2.50 on cassette.



One for snooker fans

THE game Electron-owning snooker fans have been waiting for has been released by software house CDS.

Steve Davis Snooker comes with computer play options giving demonstration games and has two particularly novel features.

It is the only snooker game which gives the user the option of making a player who

produces a foul shot resulting in a snooker go again.

And clearly visible on the screen is the score in the current break and the colour selected by the player at table, allowing the game to be left for a period and resumed when convenient.

There are a number of skill levels, three table speeds, and a large

range of power settings make for precise cue control.

You can choose from one player, two players and even no player games. If you ask Steve to play you get a demonstration game which allows you to study his technique and improve your play.

Steve Davis Snooker costs £8.95 on cassette and £12.95 on disc.

LEARNING MATHS THE HAPPY WAY

HAVING fun and learning maths aren't incompatible activities any more thanks to a suite of programs produced by ISMEC - the Independent Schools Microelectronics Program - for the Electron.

Number Games is aimed at primary school pupils and consists of six programs which explain and teach basic maths by providing simple and enjoyable games for children to play.

Boxes, Number Knight, Ladder, Little Blokes, Nimble Knight and Light Up are designed to please the eye and stimulate the youngsters' minds.

For example, in Little Blokes the user is introduced to adding by

moving a figure around a grid system, a process that involves calculating a series of moves.

Price of the cassette, which is transferable to disc and Econet compatible, is £9.95.

Now you can link your Electron to the telephone. here's how to make the most of your new hobby!



No. 1

Guide to Microcomputing on Prestel

Special supplement: Guide to Microcomputing on Prestel. Contains hundreds of page numbers covering games, education and business and utility programs for the BBC, Apple, Commodore and Spectrum. Plus hints, tips and reviews of comms products.



No. 2

Guide to communicating with your micro

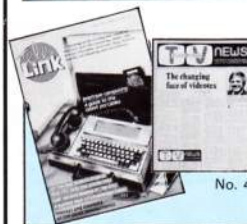
Special supplement: Guide to Communicating with your Micro. All you want to know about user-to-user communications, protocols, how modems work, an introduction to networking and PSS. Plus a guide to 39 modems listing all their special features.



No. 3

Guide to bulletin boards in the UK

Special supplement: Guide to Bulletin Boards in the UK. An in-depth survey of what bulletin boards offer and what they cost, how to access them, interviews with 12 leading sysops. Plus a complete listing of 39 bulletin boards, pinpointed on a map of the UK.



No. 4

TV NEWS

Includes the first Teletext & Viewdata News, highlighting all the latest industrial news. Plus features on financial, legal and educational databases, start of a guide to Knowledge Index, how to work out your phone bill and a survey on portable micros with comms facilities.



No. 5

Guide to communications software

Special supplement: Guide to Communications Software. A survey of 37 communications software packages for 11 of the most popular micros. Plus advice on viewdata graphics, description of the de facto standard for UK bulletin boards, Xmodem, and online humour from Punch editor Alan Coren.



No. 6

Guide to teletext page design

Special supplement: Guide to teletext page design. A leading expert tells how to achieve eye-catching viewdata graphics. Plus all about coin-operated Prestel, setting up educational viewdata systems, using packet radio to cut phone bills, on-line credit reporting.



No. 7

Guide to using electronic mail

Special supplement: Guide to using electronic mail. A detailed expert introduction to electronic mail's time-saving and cost-cutting features. Plus a challenge to Prestel's monopoly, launch of the BBC's Datacast, interview with a top US hacker, and how FarmLink is branching out.

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Grand Prix

By
**STEPHEN
MERRIGAN**

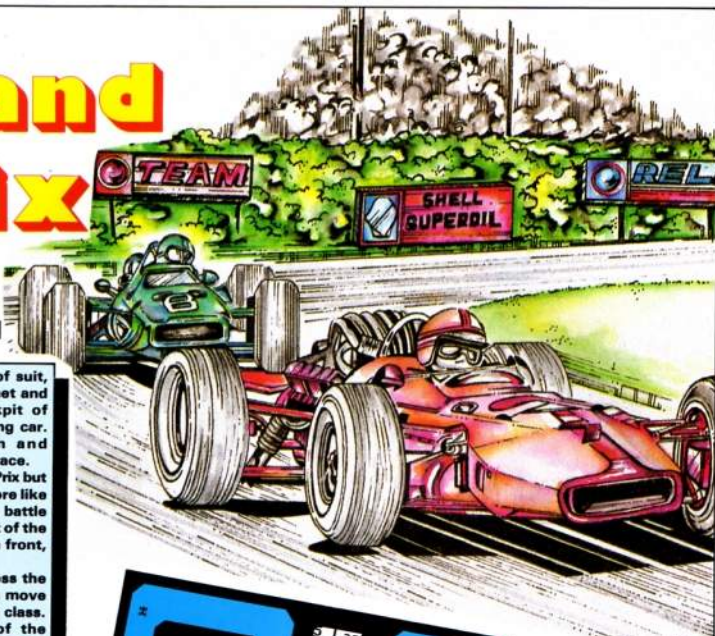
ZIP up your fireproof suit, don your crash helmet and slide into the cockpit of your grand prix racing car. Strap yourself in and prepare for the big race.

It may be a Grand Prix but at times it'll seem more like the dodgems as you battle your way to the front of the pack. Once you're in front, hang on.

If you're first across the line at the finish you move up into the next race class.

There's the skill of the competitors increases to match your own so there's always a challenge. You won't find these drivers so easy to beat.

The keys are < to turn anticlockwise and > to turn clockwise. There isn't an accelerator or brake - it's an automatic, you go flat out all the time.



VARIABLES

B%() Stores the track.
A%() Cars' directions.
Q%, W% Your car's coordinates.
q%, w% The other cars' coordinates.
a%, s%
d%, f%

PROCEDURES

var Sets the variables, defines the characters and envelopes.
draw Draws the track.
car1
car2 Moves the other cars.
car3
raceover Ends the race and moves you up to the next class if you've won.
ins Prints the instructions.
move_man Moves your car.

```

10 REM Grand Prix
20 REM By S.Merrigan
30 REM (c) Electron User
40 ON ERROR GOTO910
50 MODE6:VDU23,1,0;0;0;0
:CLS:PROCins
60 MODE4:DIMAX(2,0):DIMB
%(4):DIMB(39,31):PROCread
70 PROCvar:tiX=5:tiY=5:tiZ
=5:PROCdraw
80 PROCstarter
90 REPEAT:PROCcar1:PROCc
ar2:PROCcar3:PROCmove_man
100 TIME=0:REPEAT UNTIL T
IME>tiX:IF QX=qX AND WX=wX
OR QX=aX AND WX=sX OR QX=dX
AND WX=fX PROCdelay
110 UNTIL GZ(1)=XZ OR GZ(
4)=XZ
120 TIME=0:REPEAT UNTIL T
IME>200
130 MODE4:PROCcrace_pos
140 IF GZ(1)>GZ(4) MODE4:
PROCbeaten:GOTO70
150 MODE4:PROCcraceover
160 GOTO80
170 DEF PROCcrace_pos:VDU2

```



Grand Prix listing

From Page 9

```

31,1,0,0,0,0,19,0,1,0,0;
180 MOVEB,0;DRAW1279,0;DR
AW1279,1023;DRAW0,1023;DRAW
0,0
190 MOVE476,916;DRAW796,9
16
200 VDUS;MOVE400,950;PRIN
T;"BRAND PRX:"MOVE474,946;
BCOL0,0;PRINT;"BRAND PRX:"
VDU4
210 PRINTAB(0,5,1);"1st";T
AB(0,10);"2nd"
220 IF 0X(11)0X(4) PRINT
AB(16,5,1);"CAR 4";TAB(16,10)
;"BETWEEN CAR 1,2 & YOU'ELS
E PRINTAB(16,5,1);"YOU";TAB(
16,10);"CAR 4"
230 PRINTAB(13,VPOS+5);"
PRESS SPACE;REPEAT UNTIL I
NKEYB=32
240 ENDPROC
250 DEF PROCdelayFOR L2=
1 TO 5:TIME=0;REPEAT UNTIL
TIME>5: SOUND ~,15,5,1: SOUND
~,-15,15,1;I=I+1;PROCcar;PROCc
ar2;PROCcar3;VDU31,0X,WZ,12
26=DIR2;NEXT I;ENDPROC
269 DEF PROCcar
270 VDU23,1,0,1;PRINT"";C
LS
280 RESTORE520;FOR JX=1 TO
0;READA,B;AZ(1,JX)=A;AZ(2,J
X)=B;NEXT
290 VDU23,225,255,255,255
,255,255,255,255,255
300 FORIX=220 TO 255;VDU2
3,1X,0,0,0,0,0,0,0,0;NEXT
310 VDU23,225,255,127,63,
31,15,7,3,123,227,255,254,
252,248,248,224,192,128
320 VDU23,228,1,3,7,15,31
,63,127,255,23,229,128,192,
224,248,248,252,254,255
330 VDU23,238,0,119,34,12
6,126,34,119,0,23,231,10,31
,14,95,248,112,248,0
340 VDU23,232,66,126,90,2
4,90,126,90,23,233,0,98,248
,112,250,95,14,31,10
350 VDU23,234,0,230,60,12
6,126,68,238,0,23,235,10,31
,14,95,250,112,248,0
360 VDU23,236,0,90,126,90
,24,90,126,66,23,237,0,248
,112,250,95,14,31,10
370 VDU23,238,0,90,126,90

```

[illegible]

5,5,5,5,5,5,3,3,3,0,0,0,0,0
0,0,0,0,7,7,5,5,5,5,3,3,
3,3,3,0
598 DATA,7,7,7,-3,0,0,0,
0,0,0,0,-4,5,11,3,0,0,0,
0,0,0,0,0,0,7,7,7,-3,0,0,
-4,3,3,3,3,0,0,7,7,7,0,0,0,
0,0,0,0,0,0,0,3,3,3,-1,0,
0,0,0,0,0,0,-2,7,7,7,0,0,
0,0,3,3,3,3,0
600 DATA,7,7,7,0,0,0,0,0,
0,0,0,0,3,3,5,5,5,5,5,5,
9,5,5,5,5,5,7,7,7,0,0,0,3,
3,3,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,0,3,5,5,5,5,5,9,
5,5,5,5,5,7,7,0,0,0,3,
3,3,3,0
610 DATA,6,7,7,0,0,0,0,0,
0,0,0,0,4,5,3,3,3,4,5,
9,5,5,4,5,5,5,7,0,0,0,3,
3,3,3,0,0,7,7,7,0,0,0,0,0,
0,0,0,0,-4,5,6,5,3,5,5,5,
9,6,5,5,5,6,5,-3,0,0,0,0,
3,3,3,3,0
620 DATA,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,4,
3,3,3,0,0,7,7,7,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
630 DATA,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,3,
3,11,3,0,0,7,7,7,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
640 DATA,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0,0,7,7,7,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,3,
3,3,3,0
650 DATA,7,7,7,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
3,3,3,0,0,7,7,7,0,0,0,0,
0,0,0,-2,2,1,1,1,1,1,1,1,
-1,0,0,0,0,0,0,0,0,0,0,0,
3,3,3,3,0
660 DATA,7,7,7,0,0,0,0,0,
0,0,0,3,3,1,1,1,1,1,1,1,
0,0,0,0,0,0,0,0,0,0,0,0,
2,3,3,0,0,7,7,7,0,0,0,0,
0,0,0,3,3,3,1,1,1,1,1,7,
0,0,0,0,0,0,0,0,0,0,0,0,

```

3,3,3,0
670 DATA,7,7,7,0,0,0,0,0,0,
0,0,0,0,3,1,1,3,-3,0,0,-4,7,
7,7,0,0,0,0,0,0,0,0,0,0,
0,3,3,3,3,0,0,0,7,7,-1,0,0,
0,0,0,0,-2,3,3,3,0,0,0,0,
7,7,7,0,0,0,0,0,0,0,0,0,
0,3,3,3,3,0
680 DATA,7,7,7,1,1,1,1,1,1,
1,1,1,1,1,3,3,0,0,0,7,7,
7,-1,0,0,0,0,0,0,0,0,0,-
3,3,3,3,0,0,7,7,1,1,1,1,
1,1,1,1,1,1,3,0,0,0,7,7
7,7,1,1,1,1,1,1,1,1,1,1,
1,1,3,3,0
690 DATA,7,7,7,1,1,1,1,1,1,
1,1,1,1,1,1,2,0,0,0,0,7,7,
1,1,1,1,1,1,2,1,1,1,1,1,1,
1,1,2,0,0,-4,8,1,1,1,1,1,
1,1,1,1,1,1,1,-3,0,0,0,-4,
0,1,1,1,0,1,1,1,0,1,1,1,
1,1,1,1,-3,0
700 DATA,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0
710 DEF PROCcar1:c=X*(X
)*I)+I c=X*(X*(1)+I
c=X*PRINTTAB(27,15);GX(1)=
720 VDU31,qX,wX,32;qX=eq+
AX(2,cX),wX=X*AX(1,cX);VDU
31,qX,wX,229;c1=ENDPROC
730 DEF PROCcar2:IF RND(3
)=1 ENDPROC
740 c=X*(X*(X,X):IF c=X*
GX(2)=GX(2)+1;c=X*PRINTTAB
(17,15);GX(2)=
750 IF c=11 c=X*(RND(2)+2
760 VDU31,qX,wX,32;qX=eq+
AX(2,cX),wX=X*AX(1,cX);VDU
31,qX,wX,229;c1=ENDPROC
770 DEF PROCcar3:c=X*(X
)*I)+I c=X*(X*(X*(3)+1)+
c=X*PRINTTAB(12,15);GX(3)=
780 IF c=11 c=X*(RND(2)+2
790 VDU31,qX,wX,32;qX=eq+
AX(2,cX),wX=X*AX(1,cX);VDU
31,qX,wX,229;c1=ENDPROC
800 DEF PROCti:TIME=0;REPE
AT UNTIL TIME>3;ENDPROC
810 DEF PROCcaceover
820 VDU23,1,0;0;0;0;0;0;FX1
5
830 ti=X*ti-1:IF tiX<0 ti
X=0
840 IX=X*(RND(2)+1):IF IX>10
IX=10
850 Z=X*(X):IF IX=10 IX=10

```



```
Z-RND(3)
860 PRINTTAB(2,0);"You Ha
ve been promoted to FORMULA
";tiX+1;"racing.";TAB(0,2)
1
870 FOR I=29 TO 10 STEP-1:PR
OCT:VDUI1:SOUND0,1,30,1:SOU
ND1,-15,1+3,1:NEXT:SOUND1,1
,30,10
880 PRINTTAB(15,31);"PRES
S SPACE*FOR I=1TO15:PROCT:
VDUI0:SOUND0,1,30,1:SOUND1,
-15,1+3,1:NEXT
890 REPEAT UNTIL INKEY0=3
2
900 PROCvar:PROCdraw:ENDP
ROC
910 MODE6:VDUI:REPORT:PRI
NT;" at line "ERL:END
920 DEF PROCbeaten
930 PRINTTAB(0,0);"We are
sorry to inform you that y
ou""have not qualified for
formula ";tiX+1;"racing."
```

```
940 FOR I=30TO1STEP-1:PRO
CT:VDUI1:SOUND0,1,30,1:SOU
ND1,-15,1+3,1:NEXT:SOUND1,1
,30,10
950 PRINTTAB(15,31);"PRES
S SPACE*FOR I=1TO15:PROCT:
VDUI0:SOUND0,1,30,1:SOUND1,
-15,1+3,1:NEXT
960 REPEAT UNTIL GET$=""
970 ENDPROC
980 DEF PROCstarter
990 SOUND1,1,200,0:PRINTT
AB(20,6);"READY":K=INKEY(50
):SOUND1,1,150,0
1000 PRINTTAB(20,6);"STEAD
Y":K=INKEY(50):SOUND1,1,100
,0
1010 PRINTTAB(20,6);" 60
":K=INKEY(50):SOUND1,1,50,
0
1020 ENDPROC
1030 DEF PROCins:PRINT:VDU
19,1,0:0:0:0
1040 A$="" PRESS "18$=""
```

```
SPACE "IX=0
1050 PRINTSPC(14);"INSTRUC
TIONS""SPC(14);""*****
""
1060 PRINT" You are a form
ula six racing driver""st
riving to improve to bec
ome a""formula 1 driver.
"
1070 PRINT"On the grid you
are car number three""wat
ch out for car 4 as he is u
sually""the ace driver in
the race."
1080 PRINT"If you win a ra
ce you get promotion.""On
losing a race you are re
turned""to formula six."
1090 PRINT"Crashing into
other cars causes you""to
have to wait for a short sp
ell to""have your car repa
ired."
1100 PRINT"SPC(13);"Your
Keys Are""SPC(7);"> - rev
```

```
live clockwise""SPC(7);"< -
revolve anti-clockwise"
1110 VDU2:COLOUR0:COLOUR1
29
1120 REPEAT:IX=IX+1:IF IX=
10 IX=0
1130 TIME=0:REPEAT UNTIL T
IME>10
1140 IF IX=2 SOUND1,1,50,0
:TIME=0:REPEAT UNTIL TIME>0
8
1150 SOUND1,1,IX+RND(3),1
1160 PRINTTAB(21,22);RIGHT
$(8$,9-IX);LEFT$(8$,IX)
1170 PRINTTAB(12,22);RIGHT
$(A$,IX);LEFT$(A$,9-IX)
1180 UNTIL INKEY0=32
1190 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES



No true adventurer should be without them

Electron User October 1985.

All Epic Adventures contain the following features:

- Written in machine code to give fast response
- At least 220 fully described locations
- Commands can be entered as full sentences
- Fast game-save on tape
- Large vocabulary
- Lots of objects, treasures and puzzles to solve

The Wheel of Fortune has many additional features including an advanced command interpreter which accepts multi-statement sentences and also allows you to talk to the intelligent characters in the game.

The Wheel of Fortune

VOTED THE TOP ADVENTURE BY ELECTRON USER READERS

You are transported to a fantasy world of magic and mystery. As you wander this mystical land and encounter some strange people. They may help you to find valuable treasures but don't upset them or you may not live to find the Wheel of Fortune and return to civilisation.

THE QUEST FOR THE HOLY GRAIL: To become a Knight of the Round Table, you must find the Holy Grail and return it to Camelot. Sounds simple, but you will have to face the deadly Black Knight, befriend the beautiful maiden, summon the mystical monk and solve a host of other problems to complete your quest.

CASTLE FRANKENSTEIN: The Frankenstein monster is terrorising the villagers. You have been elected to seek out and destroy him, but where do you start? Perhaps the graveyard holds some clues, or the deserted shack? Once you enter Frankenstein's castle, your adventure has only just begun...

THE KINGDOM OF KLEIN: The Wicked Witch of the Mountain has stolen the magic Klein Bottle from the palace. She has sworn to put a hideous curse on whoever tries to recover it. Can you discover the mystical properties of the Bottle and destroy the witch? Can you then escape from her domain alive?

ORDER FORM

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The Quest for the Holy Grail	£6.95		
The Kingdom of Klein	£6.95		

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NEWSLETTER

WORD WINGS DOWN FROM WICK

CAITHNESS Glass, the company that made the Mastermind presentation bowl and many other famous engraved glass trophies, is using MicroLink for a pilot project which may eventually lead to a network linking it with its UK sales reps, agents and concession shops.

Famous all over the world for its collectors' paperweights and glass-and-silver jewellery, the firm has a greater need than most for reliable, high speed communications.

Situated in Wick, just about as far north as you can get in mainland Scotland, the company has factories in Perth and Oban, its sales office in Stoke-on-Trent, and reps, agents and retail outlets all over the UK.

"Considering the shortcomings of the postal system it would be ideal for everyone to have their own mailbox on a closed MicroLink network to facilitate ordering, financial accounting and stock control", said accounts and systems manager Homer Lindsay.

"It might even be possible to open up a section for micro owners among the 11,000 people around the world who are registered collectors of our paperweights so they can go on-line for the latest news about our products".

The password is...

WHEN someone joins MicroLink they are issued with their personal mailbox number and a unique password.

This is usually a six letter word - six is the minimum number of letters the system will accept - and the subscriber is, of course, free to change the password as often as required.

Human nature being what it is, do subscribers often lose or forget their passwords?

Says system manager Colin Rogerson: "Not very often now that MicroLink is well established. But in the early days we averaged one such

case a week.

"However the problem is easily overcome. After taking the most stringent steps to establish the subscriber's credentials we refer them to the original password they were allocated, which is kept on permanent file at MicroLink's head office, and reissue it to their mailbox.

"But it does point up the fact that subscribers should always be careful to keep a record of whatever password they are using at the moment - although not in too obvious a place - just in case they suffer a lapse of memory".

Log on to the Flying Pig

LONDON subscriber Adrian Mars is using MicroLink to operate what he claims is the world's cheapest, completely independent, professional computer consultancy service ever.

He's even calling his organisation Flying Pig Services as an indication that he believes just about anything is possible with the help of MicroLink.

Flying Pig will help both home and business micro users choose their hardware, peripherals and software and also solve technical problems.

For £5.40 clients receive via MicroLink one or more versions of a comprehensive questionnaire relating to their specific area of interest.

The completed form will be assessed by Flying Pig consultants who, says Mars, will promptly offer "an unbiased reply that could well save lots of money". The client is also entitled to 15 minutes consultancy over the phone.

Hold that train...

THE train now standing at Platform 4 can be caught courtesy of MicroLink, making subscribers rail journeys simple to organise from home or office.

If they hold a Visa, Access, American Express or Travel Key credit card they can book British Rail tickets, seat and sleeper reservations using MicroLink's new telebooking service.

Seats can be reserved at an extra cost of £1 - or £2 on Pullman services - and the charge for sleeper accommodation is £15 a berth.

MicroLink even helps subscribers choose their trains by carrying constantly updated British Rail timetables, together with fares between London and 20 major cities throughout England, Scotland and Wales.

LINK OVERCOMES HANDICAPS

MICROLINK has been chosen as the electronic medium for an innovative scheme to introduce disabled people to the world of telecomputing.

Over the next few months the Central Remedial Clinic in Dublin will operate a pilot project involving half a dozen or so people of normal intelligence but who have physical handicaps ranging from slight motor impairment to the inability to move or speak coherently.

The project is thought to be unique in that, as well as using MicroLink's electronic mail facility, it will also embrace speech synthesis and speech recognition technology in helping the disabled to communicate with the outside world.

Microelectronic resources manager Bob Allen said: "We hope that their increased ability to communicate will lead to fuller lives. I won't guarantee them a job, but at least it will give them a fighting chance in the marketplace".

Interestingly, the disabled people involved in the project aren't thrilled at the prospect of telecomputing from home.

"At first we took the traditional view that this would mean independence for them", said Allen, "but they told us it would remove the social dimension from their lives and tend to isolate them.

"So we have compromised and will arrange for them to attend centres where there is a human element combined with the working environment".

Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

Kissin' Cousins English Software Co.

THIS is a good old fashioned arcade game containing the two vital ingredients for success - it's addictive and it's fun.

The aim of the game seems to be to navigate the male cousin past all manner of hazards until he meets his female counterpart.

It all looks very simple. You move the little chap straight across the screen on a road, jumping him over the odd bush and post box.

The quality of the background graphics is so good that you may find your mind wandering from the task in hand.

Another problem is the severe shortage of time. You lose a life if you don't cross the

Having fun with the relatives

screen quickly enough. Not only that, you are being bombed as well.

It won't be long before you manage screen 1 with confidence and can then tackle the moving caterpillars on screen 2. Success here leads you on to the bouncing kangaroos, and by shooting these defenceless beasts you can obtain bonus points.

By now the road has led to the wooded countryside, and you encounter bats and moving mushrooms. These are pretty taxing, and avoiding them requires a lot of practice.

Screen 6 brings you to

some rather cute frogs, but also to a long, dissolving bridge. This one defeats me, so I don't know what happens next.

I have two criticisms. Firstly, a multi-screen game like this should give you the option of starting with any screen.

Secondly, the game lacks a high score table, merely keeping a record of the highest score.

Those points apart though, this is an entertaining family game. The graphics and the animation are of a superb standard and the sound is



adequate.

An extra bonus is that the tape contains both BBC and Electron versions of the game. (Make sure you load the right one.)

Recommended for arcade addicts of all ages.

Rog Frost

Helpful Mr Men

Word Games with the Mr Men Mirrorsoft

THIS follows in the same promising steps as the earlier Mr Men programs from Mirrorsoft. Now the number of little characters is reduced to four, but the graphics execution is greatly improved.

Mr Noisy's Word Game features Mr Funny and Mr Silly as well as Mr Noisy, and the intention of the series of activities is to practise opposites and comparatives.

Any of the nine activities can be selected from the menu, and these include options in which the child can conjure up on the screen any of the characters in any given dimensions, so a tall Mr Noisy can stand beside a wide Mr Silly.

The young children I tried this with obviously enjoyed these activities, yet a great amount of vocabulary was



being used, orally and in reading and typing at the keyboard. There is a screen dump facility included.

My favourite program, and that of many of my fellow players, was Read with Mr Bounce.

Again there is a menu with just five choices and this time the intention is to encourage practice in reading through the repetition of a number of phrases.

All in all, a fine program with a very real educational purpose, yet an equally high enjoyment factor. I highly recommend it.

Phil Tayler

The first steps

Make Sam Smile Garland Educational Software

THREE separate packages, Counting, Word Matching and Spelling are designed to help with the first steps in learning to read and count.

Each is divided into three or four sections with activities relating to the growing skills of the children using them. All have superb graphics and a most appealing format.

Number recognition, learning to count and an introduction to simple addition are all included in the activities of the first package, Counting.

As with the others in the series this program features Sam, a friendly little chap who's very sad, but easily pleased by getting the right answers to his questions.

There are four games in the counting program. The first two require you to match numerals with a number of



objects. In Game 1 a random number of croaking frogs, wriggling worms, skipping girls or barking dogs is displayed. I've discovered 18 different shapes so far.

The numeral cycles through from 1 to 10. If the number matches then Return should be pressed, if not, the Spacebar should be used.

Game 2 is similar except the numeral stays constant but the number of objects cycles through from 1 to 10.

Games 3 and 4 display two sets of different objects, and

From Page 13

the total number has to be matched with the numeral. This activity is a simple introduction to the concept of counting.

It is most important that these programs are carefully introduced to a child by an adult. The various aspects of each game are not really apparent from the screen display and the child needs to be shown what to do.

Changing from one activity to another is achieved by pressing a function key but there is no prompt on the screen to tell you when to do that.

I turned to the Word Matching program next. It has been designed to encourage the child who's just beginning to read. Objects are displayed on the screen and they have to be matched with the correct word. Again, this program only requires the use of the Spacebar to reject a word, and Return to indicate the correct answer.

The character Sam enters the screen and draws an empty box and a familiar object with the word for the object above it.

In Game 1 words are placed randomly in the box until the correct match is obtained – the

child is matching word to word.

Game 2 requires the child to remember an object word that is flashed on to the screen and match it correctly as the words are shown in turn.

Game 3 is the same but no dots are displayed after the object word leaves the screen. In all three, incorrect responses cause successive letters of the answer to appear.

The vocabulary is restricted but although the number of words is limited the quality of graphics is very high.

An interesting feature is a caterpillar that crawls along the bottom of the screen. Each correct response causes it to crawl a little further until it reaches a leaf, then a butterfly emerges and flutters back across the screen. That piece of graphics is a real credit to the program.

Finally I tried out the Spelling package. This could not be introduced to a child until the rudiments of word recognition have been mastered. The vocabulary is a subset of the Word Matching program and so forms a good follow up exercise.

However, spelling is a far higher level activity than the word matching exercises and care should be taken that the child is ready for this type of work.

John Woollard

It's a long slog to Hell

Stairway To Hell Software Invasion

BY far the biggest game I've yet seen for the Electron, Stairway To Hell is basically a graphics action game. But it has been produced on such a scale that it takes on the aura of an adventure program.

It is actually four linked programs – the first three consist of four separate screens each, and the last of these three, making a total of 15 screens, each of which is nearly a game in itself.

The object is to guide your explorer on his journey to the centre of the Earth through the various hazards to the last screen – an audience with the Devil.

I haven't seen this final screen yet, but the preceding 14 constitute a bewildering variety of detailed graphics and excellent animation.

Each is a variation on a familiar theme – climbing over obstacles, up and down ladders, jumping holes or moving hazards and collecting objects

for points.

Variation is the key word here, and I can't think of a possibility which has not been covered in some way in one or another of the locations.

Moving is by the usual keys (Z, X, * and ?) and Return for a jump. Each section of the game has some short instructions, informing you of the environments, how to score points and bonus marks, and what to look out for.

Part 1 takes you down into the subterranean world through mines, the pump room and the grotto, each with its own brand of hazard such as rock falls, trolleys and rats.

From here you move into the realms of ice and snow, which gradually thaws to become a sub-tropical forest with mutant plants.

The temperature rises still further in part three, where snakes abound in the jungle, crocodiles in the swamp, and mosquitos in the mangroves.

Should you survive the desert and the entrance to Hell, fire and brimstone are everywhere as your explorer avoids falling lava and jumps flaming pits.

I'd really love to know what the audience with the Devil is like! The instructions do have the strange observation "Is this your journey's end?", so perhaps Software Invasion are keeping something up their sleeves.

My favourite screen is the Grotto, featuring invisible tunnels which you can only enter when approaching from the correct direction. Walking happily along you suddenly find yourself on a different level!

Along the way the very skilful will have accumulated enough points and information to enable them to solve the final screen, and in doing so stand a chance of winning one of the prizes being offered – the first worth £750.

Sound, however, is only adequate but to be fair this is not surprising when you consider how much has been packed in.

Stairway To Hell has all the

Strategy on the lawn

IF you fancy a peaceful job like mowing a lawn, then this program is designed to put you off. Mind you, the rewards are quite high, with more than £1,000 – in points – to be earned by the keen and careful operator.

Your garden is, presumably, right next to Taunton Cricket Ground with Ian Botham in full flow. Quite an amazing number of cricket balls join the elastic bands and other debris lying about.

Any contact with these harmless looking bits and pieces means a new mower is required and you've only got three. A further problem is that your mower gets ruined if you venture on to grass that's already cut!

The biggest danger to life and limb is the rival mower.

Maniac Mower Kansas

This little beast is hell-bent on colliding with you, or on making you bump into the garden walls or one of the nasty objects. You can do the same and try to trap the maniac mower for additional points.

To complete the misery a karate expert is practising in the garden and he is very keen to give you the chop.

This game ought to be fun to play but it is too slow for real arcade action. There is a lot of strategy involved in keeping your mower going and trapping your rival, and the game is enjoyable at that level. But one bad feature is that the chosen

colours are awful, producing moving diagonal lines on black and white or colour TVs. Needless to say, all is well if you have a monitor.

As seems to be usual with Kansas games the instructions are excellent and a model for other software houses to copy. A feature of the program which I like is that it is written in Basic and listable, which means you can modify it to your heart's content. I'd also recommend the game to BBC Micro owners where the speed of action is good.

Arcade addicts will unfortunately find this game a disappointment, but if you prefer a slow action strategy problem and enjoy tinkering with programs then why not consider Maniac Mower?

Rog Frost

hallmarks of a very classy production. If you enjoy this sort of game, you'll love this one, and like all good adventures it will take a lot of time and perseverance to complete.

One final point. This cassette is one of an increasing number with the Electron version on one side and the BBC Micro version on the other. The result is that many shops are now stocking Electron games where previously they only carried those for the BBC Micro. Manufacturers save on production costs as one tape is cheaper to produce than two, and of course more Electron programs in the shops means more tapes sold.

This has to be good for the industry in general and Electron users in particular, and I would like to see this practice adopted by all software houses whenever it is practical.

Nick Rhodes



**Not much
down the
mine**

Diamond Mine
Blue Ribbon Software

AT just £2.50, this program is aimed quite definitely at the "pocket money" market.

However the low cost is well matched by a low interest level, little originality and little in the way of addiction.

It's not that the program is particularly bad, but just that I cannot really find very much to get enthusiastic about.

Imagine a mine - which is

essentially a vertical maze - and at the top is the beginning of a pipeline.

You must guide the pipeline down through the mine in search of diamonds. There are a number of rather cute bugs which have a disconcerting habit of eating the pipeline, and these must obviously be avoided using the usual Z,X,* combination of keys.

The walls of the mine must also be negotiated, or else a length of pipeline is lost.

Having said that, there is remarkably little to add. It is not a particularly easy game to play, although naturally success comes with practice.

Sadly, I found that boredom also set in, although the game might keep some younger players interested for a few hours.

The Electron has been around a long time now, and the level of much other software makes this particular program look rather poor in comparison.

Pat Hillery

**Packin'
a lot in**

Mexico '86
Qualsoft

HAVING played a variety of football management simulations, I eagerly loaded the first of these twin cassettes, which deals with the qualifying stages.

Actually it also includes a couple of European friendlies and the South American tour, which give ample opportunity to review your strengths and weaknesses. It also gave me the ideal opportunity to do the same to Qualsoft's program.

In some respects I was a little disappointed, for I began at the easiest skill level where the results seemed just too random and often incredible.

The sound effects are not particularly exciting, but these can be turned off. The most disappointing aspect was when I actually managed to reach the final where England beat Italy, but there wasn't a cup in sight - merely a one word message of congratulations!

The graphics, however, do give the impression of a

football match, with 22 little match men rushing up and down the pitch with great effort, although poor skill. This is, naturally, computer-controlled so you can just watch the action for a minute or so.

At the higher skill levels the whole idea becomes far more interesting, with the players' strengths and weaknesses taken into far greater account. Great skill is needed, as I found it very easy to lose many a critical game.

However when the England team does eventually qualify it is necessary to save the data on to a blank cassette, which can then be reloaded into the second part, that dealing with the finals in Mexico.

Once there a squad of 20 is

selected from the players so far used. Yes, there is an option to add extra players, so you too can play for your country! The stages here are really very authentic, but when you've won the cup once I would strongly suggest that you try at a more competitive level in order to capture the real challenge the program offers.

Sadly, although the qualifying cassette can obviously be reused there is no save facility elsewhere, and the whole program is a bit monotonous at one sitting. Still, it is a credit to Qualsoft to see just how complex an idea can be programmed into the Electron.

Phil Taylor

**All singing, all
dancing science**

The Mole Concept
BBC Soft

THIS package in the Secondary Science series breaks new ground by being in the format of "computer synchronised audio".

This means that a tape commentary - spoken by Fred Harris - is played while the software runs. The two are kept in step by the simple method of pressing a key when Fred tells you to.

The programs are discussed only. In fact the drive is kept very busy throughout the presentation which lasts about half an hour. During that time, you will be stunned by the beautiful graphics that your computer can produce, seemingly instantly.

The package aims to teach or reinforce the chemist's rather specialised concept of a mole. To him it is a unit of measurement, not a furry animal. This is achieved by tutorial sessions followed by questions.

When used with pupils aged 15 and 16 there seems to be a good balance between teaching and questioning and the novel presentation of the information encourages them to solve the problems.

If any pupil finds questions difficult then a worked answer is given on screen.

The topic is covered thoroughly during the presen-

tation, with domestic and industrial applications brought in.

In fact, long after Fred Harris has finished talking you can still be carrying out titration simulations and working out the molarity of solutions.

The accompanying booklet implies that this software should be used by individual students. Many schools would not be able to afford the computer time for this, but in fact the software works well with groups of pupils.

However it is used, there can be little doubt that students on O level or CSE chemistry courses will benefit from this software.

These pupils enjoy the novel format, the interesting voice and a touch of humour, not to mention the really lovely graphics. The learning they achieve is almost a side issue, but in fact a lot of knowledge sinks in.

This is a program that chemistry teachers really should find time for. It is a positive aid for pupils in coming to terms with this difficult idea.

Rog Frost

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DEPRESSED with
databases?
OPPRESSED with
machine code?

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TO ORDER, PLEASE USE THE FORM ON PAGE 61

OXO

demands high strategy and low cunning



1. BILL

4

2. MARY

6

A B C D E F G H I J

0										0
1		X			X		O			X
2		O	X	O	X	X		X	X	
3		O			O	X	O		O	X
4			X	O	X	X				
5	O	X	O	O	O	X	O			
6				X						
7				O	X	O				
8					X	X	X		X	
9										

2. MARY goes now

OXO is a game of strategy between two players. Each opponent takes it in turn to place either an X or an O on the 10 by 10 grid.

The object is to make as many combinations of the word OXO as possible.

The game ends when all the places are filled or when a

player resigns.

The motivation I had for writing this program came from my class at school. All credit for the ideas, layout of

the screen, design of the grid and colour combination must go to the pupils of 3R2 at Broom Field School.

The program can be loaded and run on an ordinary Electron.

However if it is to be used with a disc drive the value of PAGE must be lowered to &E00.

The program requires a lot of memory to store all the grid values and to accommodate the high resolution graphics mode. The ADFS reduces the micro's memory.

When you run the program the first prompt to be displayed is Sound? Tapping Y within 10 seconds will give full sound cues throughout the game.

The names of the two players are then entered. Only 11 characters are allowed for each name.

The prompt Auto start? then appears. If Y is pressed the Electron will randomly place up to 20 crosses on the grid at the start of the game.

We have found that this speeds up the start and makes it more interesting. It does not give the first player any

advantage or disadvantage, but it does mean that a mistake in the early part of the game may be fatal.

The computer selects which player goes first and his or her name is displayed at the bottom of the screen.

A character is placed on the grid by typing the coordinate of the required position as a letter followed by a number.

The character X or O is then pressed. Delete can be used at any time if you make a mistake.

When you're sure that the entry is correct press Return.

The game continues until, after 100 moves, the grid is full. The winner is then declared.

It is possible to resign by pressing the Escape key.

This game has been written to a structured format to help with debugging and to allow changes to be made more easily.

Lines 10 to 490 contain the main sequence of events.

From this section of the listing all the procedures and functions are called. These are contained in lines 500 onward.

By JOHN WOOLLARD

PROCEDURES

autoplay

Puts randomly selected Xs on the grid at the start of autoplay.

cube

Draws a cube.

display

Draws grid, cube and scorepad.

endmessage

States the winner.

gamesetup

Clears grid before the start of play.

get(low%,high%)

Waits until a key is pressed in the range defined by the parameters.

initiate

VDU7 if out-of-range key is pressed. Dimension variables for such things as the grid, sets up double height routine, reads data.

input

A double height utility input.

oxo1, oxo2

Analyses grid for a winning combination of O-X-O.

play

Displays the prompt and receives player's move.

print(x%,y%,a\$)

Prints a\$ out at TAB(x%,y%) in double height.

printsetup

Contains the machine code assembly for the double height print routine.

score

Uses FNOxo1 and FNOxo2 to calculate score.

tune

Plays a five note sequence.

Full listing starts
on Page 18

From Page 17

```

10REM A game of strategy
20REM By W.J. Woollard
30REM Class 3R2
40REM Broome Field School
50REM Leigh Park, HAVANT
60REM (c) Electron User
70REM
80gameword$="OXO"
90*KEY10OLD:NRUN:IM
100MODE1
110VDU23,1;0;0;0;0
120COLOUR129:COLOUR2:CLS
130PROCinitiate
140PROCprint(10,7,"A game
of strategy")
150COLOUR3:VDU19,3,11,0,0
,0
160PROCcube(150,460,660)
170COLOUR0
180PROCprint(10,27,"Sound
?")
190*FX15
200*FX210,1
210IFINKEY(999)=89THEN*FX
210
220PROCtune
230PROCprint(10,18,"Name
1: ")
240name$(1)="1."*FNinput
250PROCtune
260PROCprint(10,21,"Name
2: ")
270name$(2)="2."*FNinput
280PROCtune
290PROCgamesetup
300PROCprint(10,27,"Auto
start ?")
310autoX=0:IFINKEY(999)=8
9THENautoX=1
320PROCdisplay
330IFautoXTHENPROCautopla
y
340COLOUR1:COLOUR128
350BERRORPROCendmessage:
RUN
360goX=0
370playerX=RND(2)
380REPEAT
390playerX=playerXMOD2+1
400REPEAT
410goX=goX+1
420COLOUR3:COLOUR128

```

```

430PROCplay
440COLOUR2:COLOUR129
450PROCscore
460BUNT1LgoZ=1000RscoreX=0
470BUNT1LgoZ=100
480PROCendmessage
490RUN
500DEFFPROCautoplay
510COLOUR2
520FORX=1TO20
5301Z=RND(10)+1:nZ=RND(10
)+1
540PROCprint(1X+2+0,nZ+2+
3,CHR$(2X))
550gridX(1X,nZ)=s2X
560NEXT
570ENDPROC
580DEFFPROCcube(lenX,xposZ
,yposZ)
590MOVEExposX,yposZ
600PLOT2,0,-lenX:PLOT2,le
nX,0
610PLOT2,0,lenX:PLOT2,-le
nX,0
620PLOT2,lenX:VDU129,128
4:PLOT2,lenX,0
630PLOT2,-lenX:VDU129,-lenX
IV4
640PLOT0,lenX:VDU129,lenX:VDU
4
650PLOT2,0,-lenX:PLOT2,-le
nX:VDU129,-lenX:VDU129
660PLOT0,-lenX+24,lenX:VDU
2
670VDU5,79,88,79,4
680ENDPROC
690DEFFPROCdisplay
700LOCALc1Z,c2Z
710CLS
720PROCcube(150,80,935)
730FORc1Z=1TO100
740PROCprint(c1Z+2+0,4,C
HR$(64+c1Z))
750FORc2Z=2TO11
760PROCprint(c1Z+2+0,c2Z
+2+3,CHR$(gridX(c1Z,c2Z)))
770NEXT
780NEXT
790FORc2Z=1TO100
800PROCprint(9,c2Z+2+5,C
H$(47+c2Z))
810PROCprint(33,c2Z+2+5,C
H$(47+c2Z))
820NEXT

```

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REVIEW Jan '86

QUAL-SOFT COMMENT: At last an INTELLIGENT management game for the knowledgeable soccer enthusiast!

TAPE 1
QUALIFIERS

MEXICO '86*

TAPE 2
FINALS

A WORLD CUP MANAGEMENT SIMULATION

Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor international results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

TAPE 1 (Qualifiers)

- * Current squad of 16 players + 20 user defined players.
- * Friendlies in Paris, at Wembley + South American tour.
- * ANY team formation you choose. 2 from 5 substitutes.
- * In match tactics: any no. of individual player adjustments.
- * Your qualification group: full results and table.

TAPE 2 (Finals)

- * Choose a 20 man squad to take to the finals.
- * Group of 4 prelims, 16 to final knockout comp.
- * Extra Time, PENALTY SHOOT-OUTS, where relevant.
- * Formation and strength information on opposition.
- * 2 from 9 substitutes (the FA tells us so).

ENGLAND'S GAMES: FULL PITCH, 22 MAN, 3D GRAPHICS & SOUND EFFECTS

QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

PACKAGE: Tape 1 plus Tape 2 plus 20 Page Manual in "Video Cassette" style pack. Only £9.95 (57K RAM usage. Some would call this a MEGAGAME. YES IT WILL RUN ON YOUR 32k ELECTRON.

QUALSOFT GUARANTEE: Sent by 1ST CLASS POST on day of the order with P.O. Cheque. Access payment is received. Telephone Access orders accepted.

* The use of the name MEXICO '86 does not imply any association with FIFA

QUAL-SOFT,
Dept. EU
18 Hazelmere Rd.,
Stevenage, Herts SG2 8RX.

Tel: 0438
721936

Please supply:
MEXICO '86
Electron ☐
BBC 'B' ☐

Name:
Address:
Access No. (if applicable)

```

830names$(1)=LEFT$(names$(1),8)
840names$(2)=LEFT$(names$(2),8)
850PROCprint(0,10,names$(1))
860PROCprint(0,17,names$(2))
87ENDPROC
880DEFPROCendmessage:endsmessage=STRING$(35," ")
890PROCtune
900COLOR1
910PROCprint(0,29,endsmessage)
920IFscore$(1)=score$(2)THENendmessage="This is a draw"
930IFscore$(1)>score$(2)THENendmessage=names$(1)+" is the winner !"
940IFscore$(1)<score$(2)THENendmessage=names$(2)+" is the winner !"
950PROCprint(0,29,endsmessage)
960$F121
9701%1=INKEY(999)
980ENDPROC
990DEFPROCgamesetup
1000FORi2=0TO13
1010FORc2Z=0TO13
1020grid(c1,i2,c2Z)=46
1030NEXTZ:NEXT
1040score$(1)=0:score$(2)=0
1050ENDPROC
1060DEFNget(1owZ,highZ)
1070LOCALget%
10801%1owZ>highZTHENgetZ=1owZ
10901%1owZ=highZ:highZ=get%
1090REPEATget%GET
11001%getZ<1owZORget%>highZ
UNTIL0
1110UNTIL1(get%)=1owZ:AND(q
etZ)=highZ)
1120=get%
1130DEFPROCInitiate
1140$1=ASC(gameword$)
1150$2=ASC(MID$(gameword$,2))
1160PROCprintsetup
117001Mgrid(13,13).check(0,0)
118001Mnames$(2),score$(2)
11900FORi2=1TO8:READcheckZ(c1,i2).check(c1,i2,2):NEXT
1200DATA-1,-1,0,-1,-1,-1,-1,0
1210DATA-1,0,1,0
1220DATA-1,-1,0,1,1,1

```

```

2320ENDPROC
1240$FFNInput
1280$LOCAL vpos%, hpos%, get%,
string$
1260vpos%:=VPOS:hpos%:=POS
1270get%:=0:string$=""
1280REPEAT
1290IFget% THEN string$:=string$+CHR$(get%)
1300PROC Print (hpos%, vpos%,
string$**")
1310get%:=GET
1320IFget%!=127 THEN string$:=
LEFT$(string$, LEN(string$)-
1):get%:=0
1330UNTIL get%:=13OR LEN(string$)
=0
1340IF string$="" THEN string$
:=""
1350=string$
1360$FFNNovo1
1370$LOCAL c%
1380score%:=0
1390FOR c%:=1 TO 8
1400IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=0 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1410NEXT
1420=score%
1430$FFNNovo2
1440$LOCAL c%
1450score%:=0
1460FOR c%:=1 TO 4
1470IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1480NEXT
1490=score%
1500$FFNNovo3
1510$LOCAL c%
1520score%:=0
1530FOR c%:=1 TO 4
1540IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1550NEXT
1560=score%
1570$FFNNovo4
1580$LOCAL c%
1590score%:=0
1600FOR c%:=1 TO 4
1610IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1620NEXT
1630=score%
1640$FFNNovo5
1650$LOCAL c%
1660score%:=0
1670FOR c%:=1 TO 4
1680IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1690NEXT
1700=score%
1710$FFNNovo6
1720$LOCAL c%
1730score%:=0
1740FOR c%:=1 TO 4
1750IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1760NEXT
1770=score%
1780$FFNNovo7
1790$LOCAL c%
1800score%:=0
1810FOR c%:=1 TO 4
1820IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1830NEXT
1840=score%
1850$FFNNovo8
1860$LOCAL c%
1870score%:=0
1880FOR c%:=1 TO 4
1890IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1900NEXT
1910=score%
1920$FFNNovo9
1930$LOCAL c%
1940score%:=0
1950FOR c%:=1 TO 4
1960IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
1970NEXT
1980=score%
1990$FFNNovo10
2000$LOCAL c%
2010score%:=0
2020FOR c%:=1 TO 4
2030IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2040NEXT
2050=score%
2060$FFNNovo11
2070$LOCAL c%
2080score%:=0
2090FOR c%:=1 TO 4
2100IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2110NEXT
2120=score%
2130$FFNNovo12
2140$LOCAL c%
2150score%:=0
2160FOR c%:=1 TO 4
2170IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2180NEXT
2190=score%
2200$FFNNovo13
2210$LOCAL c%
2220score%:=0
2230FOR c%:=1 TO 4
2240IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2250NEXT
2260=score%
2270$FFNNovo14
2280$LOCAL c%
2290score%:=0
2300FOR c%:=1 TO 4
2310IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2320NEXT
2330=score%
2340$FFNNovo15
2350$LOCAL c%
2360score%:=0
2370FOR c%:=1 TO 4
2380IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2390NEXT
2400=score%
2410$FFNNovo16
2420$LOCAL c%
2430score%:=0
2440FOR c%:=1 TO 4
2450IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2460NEXT
2470=score%
2480$FFNNovo17
2490$LOCAL c%
2500score%:=0
2510FOR c%:=1 TO 4
2520IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2530NEXT
2540=score%
2550$FFNNovo18
2560$LOCAL c%
2570score%:=0
2580FOR c%:=1 TO 4
2590IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2600NEXT
2610=score%
2620$FFNNovo19
2630$LOCAL c%
2640score%:=0
2650FOR c%:=1 TO 4
2660IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2670NEXT
2680=score%
2690$FFNNovo20
2700$LOCAL c%
2710score%:=0
2720FOR c%:=1 TO 4
2730IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2740NEXT
2750=score%
2760$FFNNovo21
2770$LOCAL c%
2780score%:=0
2790FOR c%:=1 TO 4
2800IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2810NEXT
2820=score%
2830$FFNNovo22
2840$LOCAL c%
2850score%:=0
2860FOR c%:=1 TO 4
2870IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2880NEXT
2890=score%
2900$FFNNovo23
2910$LOCAL c%
2920score%:=0
2930FOR c%:=1 TO 4
2940IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
2950NEXT
2960=score%
2970$FFNNovo24
2980$LOCAL c%
2990score%:=0
3000FOR c%:=1 TO 4
3010IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3020NEXT
3030=score%
3040$FFNNovo25
3050$LOCAL c%
3060score%:=0
3070FOR c%:=1 TO 4
3080IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3090NEXT
3100=score%
3110$FFNNovo26
3120$LOCAL c%
3130score%:=0
3140FOR c%:=1 TO 4
3150IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3160NEXT
3170=score%
3180$FFNNovo27
3190$LOCAL c%
3200score%:=0
3210FOR c%:=1 TO 4
3220IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3230NEXT
3240=score%
3250$FFNNovo28
3260$LOCAL c%
3270score%:=0
3280FOR c%:=1 TO 4
3290IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3300NEXT
3310=score%
3320$FFNNovo29
3330$LOCAL c%
3340score%:=0
3350FOR c%:=1 TO 4
3360IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3370NEXT
3380=score%
3390$FFNNovo30
3400$LOCAL c%
3410score%:=0
3420FOR c%:=1 TO 4
3430IF (c% AND (1% CHECK% (c%,
1), n%+CHECK% (c%, 2)))=1 AND
get% (1% CHECK% (c%, 1), n%+
CHECK% (c%, 2))=1 THEN score%
:=score%+1
3440NEXT
3450=score%
3460$FFNNovo31
3470$LOCAL c%
3480score%:=0
3490FOR c%:=1 TO 
```

```

1750GRD1(1X,n1)=symbol1
1760PROCprint(1,13,STR#(sc
ord(1)))
1770PROCprint(1,20,STR#(sc
ord(2)))
1780PROCprint(1%+2+8,n%+2
,3,CHR#symbol1)
1790ENDPROC
1800DEFPROCprint(xtab,yta
b,word%)
1810IFword%=""THENENDPROC
1820REM PRINTAB(xtab,yta
b);word%;ENDPROC
1830LOCALc1%
1840FORc1%=1TOLEN(word%)
1850X:=xtab%+c1%1;Y:=ytab%
1860A:=ASC(MID$(word%,c1%
);CALDLb1
1870IFX=32THEN SOUND1,-15,
48+4*ARM(9,1)
1880NEXT
1890VDU11
1900ENDPROC
1910DEFPROCprintset
1920M1b1a1F:=a1F#FEE
1930FORO1a1=0TO2STEP2
1940P:=db1
1950IFOTOq1
1960STA187a:STX187a:STY187a
1970LDA187a:LDX187b:LDY087J
SR1F
1980LDA27:JSR18FFEE:LDA25
5:JSR18FFEE:LDA67:JSR18FFEE
1990LDA27:JSR18FFEE:LDA67:JSR18FFEE:JSR18FFEE
2000LDA7:JSR18FFEE:LDA7:JSR18FFEE:LDA7:JSR18FFEE
2010LDA7:JSR18FFEE:LDA7:JSR18FFEE:LDA7:JSR18FFEE
2020LDA7:JSR18FFEE:LDA7:JSR18FFEE:LDA7:JSR18FFEE
2030LDA7:JSR18FFEE
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```


LAST month we took a look at some of the Basic functions available on the Electron.

First we touched briefly on the string handling functions we already knew and loved, examples being ASC and CHR\$.

Then we went on to cover some of the functions used to handle numbers such as INT and SQR.

Finally we say how COUNT, POS and VPOS could be used in screen layouts.

This month we'll be looking at some more — the trigonometric functions such as SIN and COS that you may remember from school. We'll also be meeting a resident integer variable, @%.

But first we'll take a look at a constant, a number that never changes. Try entering:

PRINT PI

into your micro and pressing Return. Quick as a flash the Electron will hurl:

3.14159265

back at you.

Now this is strange behaviour, quite out of character for our normally fussy Electron. After all, we haven't assigned PI a value. Usually if we do something like:

PRINT A

without having first given it a value, the Electron comes up with:

No such variable

Well we haven't given PI a number, yet the micro accepts it in a PRINT command without so much as a murmur. What's going on?

The answer is that PI isn't a variable, it's a constant. That 3.14159265 — or 3.142 to its friends — is so useful a number that those awfully clever Acorn people have built it into the machine, available at the drop of a PI.

And PI stays at that value. You can't change it, as you'll find if you try:

LET PI=89

This PI is Pythagoras' Constant, that rather special number that mathematicians love. You've probably used it

to find the area of a circle which is PI times the square of the radius.

It's an amazing number, turning up in all sorts of unexpected places in maths — but what is it doing inside the Electron?

Before we answer that let's have a look at two more functions, RAD and DEG, which deal with angles.

Again you'll probably remember about angles from school, with things like "the interior angles of a triangle add up to 180 degrees" and "an angle of 90 degrees is called a right angle" burnt into your memory. Figure 1 shows some examples.

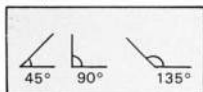


Figure 1: Angles and degrees

However while you may measure angles in degrees, the Electron uses a different system of measurement called radians. You're both measuring the same thing but using different units.

It's not unlike the way we have two scales for measuring temperature, Fahrenheit and Celsius. A Fahrenheit degree is not the same as a Celsius degree, each representing the same temperature with a different number. However, whether we call it 0 degrees Celsius or 32 degrees Fahrenheit, it's still freezing point.

It's the same with radians and degrees, they measure the same thing but in different units. And if you're really keen I'll tell you that one radian is the angle subtended at the centre of the circle by an arc of the same length as the radius of that circle.

Maybe Figure 2 will make that clearer. But don't worry if it doesn't, because the Electron will do it all for you, without you having to worry about radians.

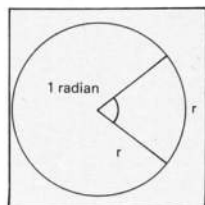


Figure 2: A radian

It's easy. If you know the number of degrees in an angle then the RAD function converts this to radians. So if the angle is 45 degrees use:

PRINT RAD(45)

to give you the result:

0.785398163

Using RAD you can convert from degrees to radians without knowing much about either. Program 1 does it for you.

```
10 REM Program 1
20 INPUT "Give me an angle in degrees " angle
30 PRINT
40 PRINT "angle" degrees
   is the same as "RAD(angle) " radians"
```

Program 1

If you're like me you'll find all the long decimals produced by RAD rather difficult to remember. There is an easier way to think about them. Try:

PRINT RAD(180)

which, unless your Electron is

very different from mine, should result in:

3.14159265

Now doesn't this remind you of something? Like our old friend PI?

In fact an angle of 180 degrees measured in radians — or circular measure as it's sometimes called — is exactly PI radians. And an angle of 360 degrees is 2*PI radians while one of 90 is 0.5*PI radians. Try it and see.

This is how we normally talk about angles measured in radians, in terms of "so many" PI radians where "so many" is a positive number.

And it's here the constant PI comes in useful as is shown in Program 2, which converts degrees into radian measure in the "so many" PI form. Don't worry about @% for the time being, we'll deal with it later.

Table 1 shows some of the more significant radian measures:

Degrees	Radians
30	PI/6
45	PI/4
60	PI/3
90	PI/2
180	PI
360	2*PI

Table 1: Radians and degrees

```
10 REM Program 2
20 @% = 2*282
30 INPUT "Give me an angle in degrees " angle
40 PRINT
50 PRINT "angle" degrees
   is the same as "RAD(angle) / 3.14159265" PI radians"
60 @% = 10098A
```

Program 2

Having spent so long on PI,

RAD and radians I'll now inform you that there's a Basic function that turns radian measures into degrees.

It's the aptly named DEG function. So, if your Electron has gone through a long and involved calculation and presented you with a result in radians, you can use DEG to convert it to the more meaningful degrees. Program III shows it in action:

```
10 REM Program III
30 INPUT "Give me an angle in radians " angle
40 PRINT
50 PRINT "angle" radians is the same as "DEG(angle) degrees"
```

Program III

After all that, let's see what we can make of angles measured in radians. Again you'll probably be familiar with the trigonometric functions from the classroom. Figure III should brush up your memory.

The three basic trig functions — as they're known for short — are available on the Electron in the form of SIN, COS and TAN. If you want to know the sine of an angle, say 30 degrees, all you have to do is use SIN. However, beware. If you think that:

SIN(30)

will give you the sine of 30 degrees then think again. Remember that the Electron uses radian measure, not degrees as we do. So the 30 degrees has to be translated into radians using RAD and then this result is used inside the brackets of SIN. So:

PRINT RAD(30)

gives the radian equivalent of 30 degrees:

0.523598775

SIN then gets to work on this and:

PRINT SIN(RAD(30))

gives the result 0.5 which is the sine of 30 degrees.

However that's a bit longwinded. We can get the same effect with:

PRINT SIN(RAD(30))

provided that we're careful with our brackets. While you're at it you can find the cosine and tangent of 30 degrees using:

PRINT COS(RAD(30))

and:

PRINT TAN(RAD(30))

As well as having functions to allow you to determine the sines, cosines and tangents of angles, the Electron has functions to do the reverse. These are ACS, ASN and ATN. Their argument — the figure in the brackets — is taken to be a trigonometric value and the function produces the angle that corresponds to that value.

Suppose we knew that the number 0.5 is the sine of an angle, but we don't know which angle. We can then use ASN to tell us what the angle is. So SIN gives the sine of an angle while ASN determines the original angle from its sine.

To find the angle that has 0.5 as its sine we use:

PRINT ASN(0.5)

However the resulting:

0.523598775

isn't all that meaningful, is it?

It's an angle all right but it's measured in radians. The function DEG comes to our rescue as:

PRINT DEG(0.523598775)

shows. As before it's easier if we do both operations in the same step:

PRINT DEG(ASN(0.5))

Similarly ACS undoes the work of a cosine while ATN reveals the angle behind a tangent as:

PRINT DEG(ACS(0.5))

and:

PRINT DEG(ATN(1))

demonstrate.

Now you know about the trig functions what can you do with them? The answer is that it's mostly in mathematical applications that are really beyond the scope of a beginner's series or in graphics.

Happily there's a graphics series starting in *Electron User* soon so you'll get plenty of opportunity to use your new found knowledge.

In the meantime let's try out our trig functions on the rather artificial problem shown in Figure IV.

Have you ever been one of those summer fairs where the army has an aerial runway? It's a tower with a rope running to the ground at a shallow angle. Intrepid or lemming-related fun-lovers hurl themselves off the tower using a pulley to slide down the rope in safety if not in comfort.

Now while the length of the tower is fixed — we'll assume 100 units — the angle between

the rope and the ground, and hence the length of rope needed, varies with the distance of the landing point from the tower. The shallower the angle the longer the rope.

Program IV allows you to try out different distances from the tower, giving you the angle and rope length in each case.

```
10 REM Program IV
20 towerHeight=100
30 INPUT "How far away is the landing point from the tower? " groundLength
40 angle=ATN(towerHeight/groundLength)
50 ropeLength=towerHeight/SIN(angle)
60 PRINT
70 PRINT "The rope length is "ropeLength
80 PRINT
90 PRINT "The angle is "DEG(angle) " degrees"
100 PRINT
```

Program IV

As I've said it's a fairly artificial problem but it does show the trig functions in use.

Try altering it to solve other aspects of the tower problem. Suppose the rope was only 200 units long. What's the maximum distance the landing point can be from the tower? And see what happens if you decide the distance will be zero (presumably you're abseiling!). Can you mugtrap the input to avoid this error?

● All that should keep you busy until next time when we'll be exploring that mysterious @% and looking at alternatives to INPUT.

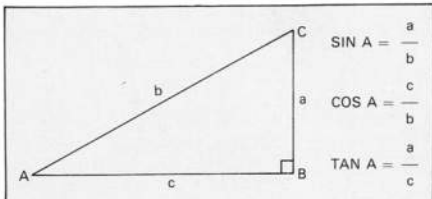


Figure III: Trigonometric functions

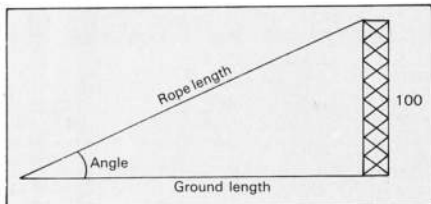


Figure IV: Tower and triangles

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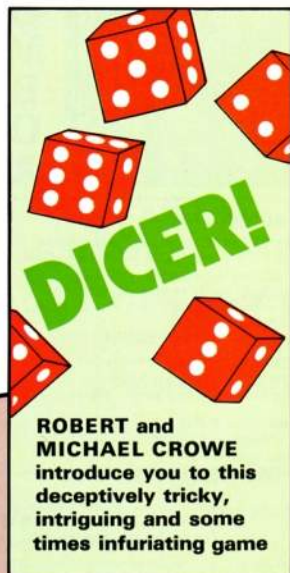
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DICER is a simulation of a compelling, traditional dice game which can be played by one to four players. The object is to get the highest score possible by using a set of five dice to tick off each one of a special list of scoring combinations.

Players take turns at throwing the dice, each turn consisting of a maximum of three throws. After each of the first two throws you may:

- Throw all the dice again.
- Hold selected dice and throw the rest.
- Accept the throw as seen.

On the third throw of the dice you must accept the dice shown.

Your task – and the crux of the whole game – is to choose one of the available scoring combinations for that turn's score. Once you've chosen an option you can't pick it again, so take care.

Having made a valid selection your score for that option is calculated and displayed on the score sheet, your running total is updated, and play passes to the next person. The game cycles round all the players until everyone has had

13 turns – sufficient to cover all the scoring combinations possible.

If you should wish to hold some of the dice and re-throw the others, first answer Y to the re-throw prompt.

You will then see displayed above the dice five tick symbols. These indicate the die or dice that will be re-thrown. Selecting the number of the dice that you

wish to retain will change the tick to a cross symbol.

If you find you have made an error, entering the number of the appropriate dice will change its symbol back to a tick. Once you are satisfied with your selection, confirm it by pressing the Spacebar and the remaining dice will be thrown again.

When you decide to accept a throw, enter N at the

re-throw prompt and you will be asked to enter the category number in which you wish your score to be entered.

There are two sections to the score sheet. The upper section simply totals the number of like dice as shown in Figure I. The lower section consists of special scores based on special combinations such as triplets, as shown in Figure II.

Should the total scores achieved in the upper section – options 1 to 6 – be greater than 61, a bonus of 30 points is awarded.

There will be occasions when the combination displayed after three turns does not match any of the remaining scoring options. You might, for instance, have chosen it earlier.

Should this occur you must pick one of the outstanding options – which will be ticked off the list for a score of zero. The point is that you must always score something at the end of your turn, even if it is a zero.

You'll find Dicer intriguing, thought-provoking and infuriating. Do yourself a favour – type it in today.

DICER!

No.	Category	Score	Player
			1 2 3
1.	1's	1xNo. of 1's	
2.	2's	2xNo. of 2's	
3.	3's	3xNo. of 3's	4
4.	4's	4xNo. of 4's	8
5.	5's	5xNo. of 5's	
6.	6's	6xNo. of 6's	
7.	dice total		
8.	Quads	dice total	
9.	Triplets	dice total	29
10.	Full house	25	25
11.	Low straight	38	
12.	Hi-straight	48	
13.	Dicer!	55	40
14.	Lucky chance	dice total	
TOTAL:		35	48
(Player)		1	2 3

Player 2:
Use keys:
12345
SPACE-CONFIRM
✓- THROW
X- HOLD



Combination	Scoring	Range
Ones	Total all ones	1-5
Twos	Total all twos	2-10
Threes	Total all threes	3-15
Fours	Total all fours	4-20
Fives	Total all fives	5-25
Sixes	Total all sixes	6-30

Figure 1: Upper section of score sheet - options 1 to 6

Combination	Description	Score
Triplets	Any three dice the same	Total value of ALL dice Total value of ALL disc
Quads	Any four dice the same	
Full house	Two dice the same, the other three the same	
Low straight	A consecutive run 12345	25 points
High straight	A consecutive run 23456	30 points
Dicer	All five dice the same	40 points
Lucky chance	Any five dice	55 points
		Total value of ALL dice

Figure 2: Lower section of score sheet - special scores

FUNCTIONS

FNval1-6	Used to calculate score.
FNdicetot	Totals all five dice.
FNnumber%(no%)	Calculates how many numbers thrown.
FNreplay	Another game?

ARRAYS

cat%(4,13)	TRUE when category used.
dice%(5)	Each dice's value.
total%(4)	Player's current score.
true%(5)	TRUE when re-throw required.
sc%(4,13)	Stores each player's score in each category.

MAJOR VARIABLES

goes%	Round number.
times%	Player's turn.
tries%	Number of re-throws for current player.
pl%	Number of players.
dot%	Puts dots on dice.
c%	Chosen category.
name\$	Category name.

PROCEDURES

envelope	Defines SOUND envelope.
colour	Changes colour.
characters	Defines characters.
players	Prompts for number of players.
variables	Initialises arrays.
set_up	Sets up screen.
window	Clears text window.
cancel	Toggles tick and cross signs.
choose	Prompts for re-throw.
throws	Random number generator for dice.
draw	Draws dice.
dice	Prints ticks and crosses.
cat	Category input.
value	Works out points scored.
printscore	Updates and prints totals.
addition	Calculates final totals.

Dicer listing

```

10 #FX229,1
20 REM DICER!
30 REM BY R and M CROME
40 REM (c) ELECTRON USER
50 MODE1
60 ON ERROR GOTO 2300
70 VDU23;8202;0;0;0;
80 PROCenvelope
90 PROCcolour
100 PROCcharacters
110 PROCplayers
120 PROCvariables
130 PROCset_up
140 FOR goes2=1TO13
150 FOR times1=1TOpl1
160 PROCwindow
170 tries1=1
180 PROCcancel
190 PROCchoose
200 NEXT1NEXT
210 PROCaddition
220 a$=FNreplay:IF a$="N"
OR a$="n" END ELSE RUN
230 REM*****
240 REM setup envelope
250 DEFPROCenvelope
260 ENVELOPE1,1,1,1,2,0
,32,126,0,0,-126,126,126
270 ENDPROC
280 REM Number of players
290 DEFPROCplayers
300 PROCtitle
310 #FX15,1
320 PRINTTAB(9,15)"Number
of players (2-4)?"
330 REPEAT:ROUND1,-15,140
,1
340 key$=BET$;pl1=VAL(key
$)
350 UNTIL pl1<5 AND pl1>1
360 ENDPROC
370 REM*****
380 REM Set up variables
390 DEFPROCvariables
400 DIM cat2(4,13),dice2(
5),total2(4),true2(5),sc2(4
,13)
410 FORloop1=1TO5:true2(1
oop1)=TRUE:1NEXT
420 FORloop1=1TO4:FORloop
2=1TO13:cat2(loop1,loop2)
=FALSE:NEXT1NEXT
430 ENDPROC
440 REM*****
450 REM define characters
460 DEFPROCcharacters

```


From Page 25

```

478 VDU23,224,0,1,2,4,136
,00,32,0,23,225,129,66,36,2
4,24,36,64,129,23,226,255,2
55,255,255,255,255,255,255
488 ENDPROC
498 REN*****
508 REN Set up screen
518 DEFPROCset_up
528 PROCtitle
538 COLOUR0:COLOUR13:PRI
NTTAB(0,3);STRING(40," ")
548 COLOUR0:COLOUR13:PR
INTTAB(1,3);"No.:"TAB(4,3);
" Category ":"TAB(17,3);"
Score ":"TAB(29,3);"Pla
yer"
558 colX:=1:COLOUR120
568 FORloopI:=270(27+(pl
I*3)) STEP3
578 COLOUR colX:IF colX=4
COLOUR1
588 PRINTTAB(loopI,4);col
I
598 colX:=colX+1
600 NEXT
618 FORloopI:=1TO13
628 COLOUR1:PRINTTAB(0,lo
opI*5);loopI;" "
638 NEXT
648 FORloopI:=1TO6
658 COLOUR3:PRINTTAB(0,lo
opI*5);loopI;" "
668 COLOUR2:PRINTTAB(17,1
oopI*5);loopI;"xNo.of:"loop
I;" "
678 NEXT
688 RESTORE2400
698 FORloopI:=7TO13
708 READ name0,col
718 COLOUR3:PRINTTAB(4,lo
opI*5);name0
728 COLOUR2:PRINTTAB(17,1
oopI*5);IF colX=0 PRINT"di
ce total" ELSE PRINT;" "
;col
738 NEXT
748 MOVE125,400:DRAW125,0
90:MOVE10,400:DRAW10,090:
MOVE90,400:DRAW090,090:MOV
E0,400:DRAW1279,400:MOVE8,4
00:DRAW0,090:MOVE1279,400:D
RAW1279,090:MOVE0,040:DRAW1
279,040
758 PRINTTAB(1,20);"TOTAL
"TAB(1);"Player"
768 FORloopI:=1TO13:COLOU
R loopI:IF loopI=4 COLOUR1
778 PRINTTAB(9+(4*loopI),
21);loopI:NEXT
788 COLOUR129:VDU20,0,29,
20,24:CLS
798 ENDPROC
808 REN*****
818 REN change yellow to
cyan
828 DEFPROCcolour
838 VDU19,2,4,0,0,0
848 ENDPROC
858 REN*****
868 REN Print title
878 DEFPROCtitle
888 COLOUR:CLS
898 PRINTTAB(17,0)"DICE!"
"
908 COLOUR3:PRINTTAB(17,1
)"*****"
918 ENDPROC
928 REN*****
938 REN ask if rethrow is
needed
948 DEFPROCchoose
958 PROCthrow
968 tries:=tries+1
978 VDU26:PROCwindow
988 *FX15,1
998 COLOUR2:PRINTTAB(0,2)
;"RETHROW(Y/N)"
1008 REPEAT:ts=GET$:UNTIL
ts="Y"OR ts="N"
1018 IF ts="N" PROCcat:END
PROC
1028 PROCwindow:COLOUR2
1038 PRINT"Use keys:"TAB(3)
;"12345"TAB(0)"SPACE-CONFIR
M:"PRINTCHR(224);"- THROW"P
RINTCHR(225);"- HOLD"
1048 PROCdice
1058 PROCthrow:IF tries=
3 PROCcat:ENDPROC
1068 GOTOD60
1078 ENDPROC
1088 REN*****
1098 REN produce random nu
mber
1108 DEFPROCthrow
1118 FOR throw:=1TO5
1128 IF trueI(throw)=TRUE
diceI(throw)=RND(6):PROCd
raw(diceI(throw),throwI)
1138 NEXT
1148 ENDPROC
1158 REN*****
1168 REN draw dice
1178 DEFPROCdraw(noI,dI)
1188 SOUND11,1,00,3
1198 xI:=dI*125-25:BCOL0,
0,0:MOVE(125)-70,210:PRIN
TCHR(224)
1200 VDU24,xI-75;100;xI;17
5;:CL0:VDU26
1210 RESTORE(2400+(noI*0)
)
1220 FORdotI:=1TOnoI:READ p
I,yI
1230 SOUND410,-15,70,2
1240 BCOL0,0;pI*pI*xI-75;y
I*yI+100:FORI:=pI-2TOpI+2:F
ORhI:=pI-2TOpI+2:PL0T69,I,h
I:NEXTI:NEXT
1250 NEXT
1260 ENDPROC
1270 REN*****
1280 REN delete ticks and
crosses
1290 DEFPROCcancel
1300 FORloopI:=1TO5:trueI(l
oopI)=TRUE:
1310 VDU5:BCOL0,1:MOVE(lo
opI*125)-70,210:PRINTCHR(226
1320 NEXT:VDU4
1330 ENDPROC
1340 REN*****
1350 REN option to hold di
ce
1360 DEFPROCdice
1370 PROCcancel:VDU5
1380 FORloopI:=1TO5
1390 BCOL0,0:MOVE(loopI*12
5)-70,210:PRINTCHR(224)
1400 HOLD(loopI*125)-70,94
:PRINT:loopI
1410 NEXT
1420 REPEAT:*FX15,1
1430 A0=GET$:UNTIL A0=" "
OR INSTR("12345",A0)<0
1440 IF A0=" " VDU4:ENDPRO
C
1450 t:=VAL(A0)
1460 MOVE(t*125)-70,210:IF
trueI(t)=TRUE trueI(t)=FAL
SE:BCOL0,1:PRINTCHR(226):BC
OL0,0:MOVE(t*125)-70,210:PR
INTCHR(225) ELSE trueI(t)=TRU
E:BCOL0,1:PRINTCHR(226):BCOL
0,0:MOVE(t*125)-70,210:PRIN
TCHR(224)
1470 GOTOD120
1480 REN*****
1490 REN enter category no.
1500 DEFPROCcat
1510 REPEAT
1520 PROCwindow:COLOUR2
1530 *FX15,1
1540 PRINTTAB(25,24);"Ente
r cat. no.:"
1550 INPUT cI:UNTIL cI>0 A
ND cI<14
1560 IF catI(timesI,cI)=T
RUE GOTOD1510
1570 catI(timesI,cI)=TRUE
1580 PROCvalue:PROCprintsc
ore(cI):ENDPROC
1590 REN*****
1600 REN clear text window
1610 DEFPROCwindow
1620 SOUND411,-15,150,3
1630 COLOUR120:VDU20,25,31
,39,23:CLS
1640 COLOUR timesI:IF time
sI=4 COLOUR1
1650 PRINTTAB(0,0);"Player
"timesI;" "
1660 ENDPROC
1670 REN*****
1680 REN value dice depend
ing on category
1690 DEFPROCvalue
1700 IF cI<7 scI(timesI,cI
)=FNval1(cI):ENDPROC
1710 IF cI=7 scI(timesI,cI
)=FNval2(3):ENDPROC
1720 IF cI=8 scI(timesI,cI
)=FNval2(4):ENDPROC
1730 IF cI=9 scI(timesI,cI
)=FNval3:ENDPROC
1740 IF cI=10 scI(timesI,c
I)=FNval4:ENDPROC
1750 IF cI=11 scI(timesI,c
I)=FNval3:ENDPROC
1760 IF cI=12 scI(timesI,c
I)=FNval6:ENDPROC
1770 IF cI=13 scI(timesI,c
I)=FMDicatot:ENDPROC
1780 REN*****
1790 REN Print score and u
pdate total
1800 DEFPROCprintscore(pI)
1810 COLOURtimesI:IF times
I=4 COLOUR1
1820 VDU26:PRINTTAB((26+(t
imesI*3)),5*pI);scI(timesI
,pI)
1830 totalI(timesI)=totalI
(timesI)+scI(timesI,pI)
1840 PRINTTAB(9+(4*timesI)
,20);totalI(timesI)
1850 ENDPROC
1860 REN*****
1870 REN final totals
1880 DEFPROCfinal
1890 VDU20,0,31,39,28,17,1
20,12
1900 FORloopI:=1TOpI
1910 COLOUR loopI:IF loopI

```

```

4=4 COLOUR1
1920 PRINTTAB(1,loop12)*P
layer "loop12" Score "tot
al1(loop12)+BONUS(");
1930 no1=sc1(loop1,1)+sc1(
loop1,2)+sc1(loop1,3)+sc1(
loop1,4)+sc1(loop1,5)+sc1(
loop1,6)
1940 IF no1>62 total1(lo
op1)+total1(loop1)+30:PRINT
;30; ELSE PRINT;0;
1950 PRINT")=";:PRINT;tot
al1(loop1);NEXT
1960 ENDPROC
1970 REN=====
1980 REM functions
1990 DEFFNnumber(no1)
2000 test1=0:FORloop1=1TO5
2010 IF dice1(loop1)=no1 t
est1=test1+1
2020 NEXT: test1
2030 REN=====
2040 DEFFNval1(k1)
2050 =(k1*FNnumber(k1))
2060 REN=====

```

```

2070 DEFFNval2(k1)
2080 flag1=FALSE
2090 FOR1=1TO4
2100 IF FNnumber(11)>=(k1)
flag1=TRUE
2110 NEXT
2120 IF flag1=TRUE =FNdice
tot ELSE =0
2130 REN=====
2140 DEFFNval3
2150 11=0:FORloop1=2TO6
2160 IF dice1(loop1)<>dice
1(1) 11=dice1(loop1)
2170 NEXT:IF 11=0 THEN =0
2180 IF (FNnumber(dice1(1)
)=3 AND FNnumber(11)=2) OR
(FNnumber(dice1(1))=2 AND
FNnumber(11)=3) THEN =25 EL
SE =0
2190 REN=====
2200 DEFFNval4
2210 IF FNnumber(3)=1 AND
FNnumber(4)=1 AND ((FNnum
ber(11)=1 AND FNnumber(2))=
1)OR (FNnumber(2)=1 AND FN

```

```

number(5))=1)OR (FNnumber(5
)=1 AND FNnumber(6)=1) T
HEN =30 ELSE =0
2220 REN=====
2230 DEFFNval5
2240 IF FNnumber(2)=1 AND
FNnumber(3)=1 AND FNnumber(
4)=1 AND FNnumber(5)=1 AND
(FNnumber(1)=1 OR FNnumber
(6)=1) THEN =40 ELSE =0
2250 REN=====
2260 DEFFNval6
2270 five1=FALSE
2280 FOR1=1TO6:IF FNnumbe
r(11)=5 five1=TRUE
2290 NEXT:IF five1=TRUE =5
5 ELSE =0
2300 REN=====
2310 DEFFNdice1tot
2320 =(dice1(1)+dice1(2)+d
ice1(3)+dice1(4)+dice1(5))
2330 DEFFNreplay
2340 COLOUR1:COLOUR120:
2350 PRINTTAB(14)*"ANOTHER
GAME(Y/N)?"

```

```

2360 REPEATreplay=GET$:U
NTIL INSTR("Yn",replay)<
>0
2370 =replay0
2380 MODE:REPORT:PRINT "
at line "ERL
2390 REN CAT. DATA
2400 DATATriplets,0,Quads,
0,Full house,25,Low straigh
t,30,Hi-straight,40,Dicer!,
55,Lucky chance,0
2410 DATA37,37
2420 DATA10,65,65,10
2430 DATA10,65,37,37,65,10
2440 DATA10,65,65,10,10,10
,65,65
2450 DATA10,65,65,10,10,10
,65,65,37,37
2460 DATA10,65,65,10,10,10
,65,65,10,37,65,37

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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LAST time we saw how to use Osword &72 to read and write data from or to the disc. This month we'll use the same method to produce a sector editor, a utility that will enable us to modify the contents of the disc.

It not only allows files to be edited, but directories as well and this will enable filenames and load and execution addresses to be altered. It can even be used to recover deleted files.

When the editor is run you'll be asked for a disc address in hexadecimal. Enter any number between 0 and 4FF. This is the sector number counting from sector zero on track zero. The sector selected is now loaded into RAM and displayed in both hexadecimal

and Ascii.

There are quite a few control keys to remember so I've listed them in Table 1.

Each sector is 256 bytes long but only 128 bytes are displayed on the Mode 6 screen. Shift+cursor up displays the first 128 bytes and Shift+cursor down the second 128.

Square brackets enclose the byte to be altered in the hex dump and the cursor flashes underneath the corresponding Ascii character on the

right of the screen. The four cursor keys when used on their own allow you to move throughout the 128 bytes displayed.

Shift+cursor right moves on to the next sector while Shift+cursor left moves back a sector. To move quickly across the disc a track at a time use Ctrl+cursor left or right.

To alter a byte press either A to input an Ascii character or H to input the new value in hexadecimal. Note however that this only alters the copy of

the sector that has been loaded into RAM. The disc remains unaltered.

The altered sector can be written to the disc by selecting S to save it. You'll see a flashing message at the bottom of the screen asking for confirmation. Pressing Y will save the sector and N will leave it as it was.

A sector editor is a very powerful and essential tool for the disc owner. Be careful though – you can quite easily destroy the contents of a disc.

BBC/ELECTRON PROFESSIONAL SOFTWARE

Our educational software is used in thousands of schools and homes throughout Great Britain.

EDUCATIONAL 1

Hours of fun and learning for children aged five to nine years. Animated graphics will encourage children to enjoy counting, maths, spelling and telling the time. The tape includes six programs: MATH 1, MATH 2, CUBECOUNT, SHAPES, SPELL and CLOCK.

... 'An excellent mixture of games'... Personal Software – Autumn 1983.

BBC/ELECTRON

Tape £6.95 Disc £8.95

EDUCATIONAL 2

Although similar to Educational 1 this tape is more advanced and aimed at seven to twelve year olds. The tape includes MATH 1, MATH 2, AREA, MEMORY, CUBECOUNT and SPELL.

BBC/ELECTRON

Tape £6.95 Disc £8.95

FUN WITH NUMBERS

These programs will teach and test basic counting, addition and subtraction skills for four to seven year olds. The tape includes COUNTING, ADDING, SUBTRACTION and an arcade type game called ROCKET MATHS which will exercise addition and subtraction. With sound and visual effects.

These are excellent programs which teachers on the project have no hesitation in recommending to other teachers'... Computers in Classroom Project.

BBC/ELECTRON

Tape £6.95 Disc £8.95

FUN WITH WORDS

Start your fun with alphabet puzzle, continue your play with VOWELS, learn the difference between THERE and THEIR, have games with SUFFIXES and reward yourself with a game of HANGMAN.

... 'Very good indeed'... A&B Computing – Jan/Feb 1984

BBC/ELECTRON

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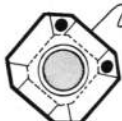
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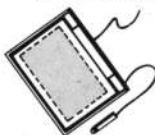
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However you can just as easily restore a corrupted disc as well. Experiment with the editor using a disc which has nothing valuable on to begin with.

Try examining a few discs and see what's there. Find out what happens to the contents when you delete a file, by examining it before and after.

● Next time we'll see how to restore deleted and corrupted files and we'll write a recover utility.

Cursor	Move throughout the display
Shift+cursor up/down	Display first or second 128 bytes
Shift+cursor left/right	Move back or forward one sector
Ctrl+cursor left/right	Move back or forward one track
A	Ascii input
H	Hexadecimal input
S	Save the sector

Table 1. A summary of the control keys

```

10 REM Sector Editor
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 ON ERROR GOTO 100
EXPORT:PRINT"at line ":ERL:
END
50 MODE 6:HIMEM=&5000
60 PROCinitialise
70 REPEAT key$=CHR$GET
80 IF INSTR("^\",key$)
  AZ=AZ-(key$="^")+1+(key$="^")
  -16*((key$="^")-(key$="^"))
  PROCdisc("read"):PROCdisc
  lay
  90 IF key$="" OZ=0:PROC
  display
  100 IF key$=" " OZ=&80:PR
  OCdisplay
  110 IF INSTR("AHah",key$)
  PROCinput
  120 IF INSTR("Ss",key$) P
  ROCsave
  130 PROCmove:=FX21
  140 UNTIL FALSE
  150
  160 DEF PROCinitialise
  170 VDU19,0,&4,0;
  180 VDU28,1,24,39,0
  190 #MOUNT
  200 #FX4,1
  210 #FX16
  220 cursor$=CHR$136+CHR$1
  37+CHR$130+CHR$139
  230 FDC=&500:osword=&FFF1
  240 REPEAT
  250 INPUT "Input disc add
  res...&A$
  260 IF A$="" A$=&FFFF
  270 AZ=EVAL("&"+A$)
  280 UNTIL AZ=1 AND AZ<&5
  290 CLS:PRINT TAB(0,1)AD
  FS Sector Editor":TAB(0,3)"
  Track":TAB(12,3)"Sector":
  TAB(25,3)"Address:"
  300 PROCdisc("read")
  310 PROCdisplay
  320 xx1=0:yy1=0:key$="":P
  ROCmove
  330 ENDPROC
  340
  350 DEF PROCdisc(function
  $)
  360 AZ=(AZ+&500)MOD &500
  370 ?FDC=0
  380 FDC1=&5000
  390 IF function$="write"
  FDC75=&A ELSE FDC75=&B
  400 FDC76=AZ DIV &1000:FDC
  C77=(AZ DIV &100)AND &FF:FDC
  C78=AZ AND &FF
  410 FDC79=1
  420 ZX=AZ:AZ=67:YZ=FDC 0
  IV 256:ZX=FDC MOD 256:CALL
  osword:AZ=ZX
  430 IF ?FDC=0 PRINT TAB(0
  ,24)*** Disc Error ***:CH
  R$7: ELSE PRINT TAB(0,24):S
  PC(20):
  440 ENDPROC
  450
  460 DEF PROCdisplay
  470 AZ=(AZ+&500)MOD &500:
  REM get within range
  480 PRINT TAB(6,3):AZDIV1
  6:" :TAB(19,3):AZMOD16:" "
  :TAB(34,3):AZ
  490 PRINT TAB(0,5):
  500 FOR IX=0 TO 15
  510 A$="":PRINT:~(OZ+IX*8
  )DIV16:(IX*8)MOD16:"":CHR$
  ?;
  520 FOR JX=0 TO 7
  530 BX=?(&5000+OZ+IX*8+JX
  )
  540 IF BX>31 AND BX<127 A
  $=A$+CHR$BX ELSE A$=A$+" "
  550 PRINT:"BXDIV16:"BXMOD
  16:CHR$9;
  560 NEXT
  570 PRINT CHR$9:A$
  580 NEXT
  590 ENDPROC
  600
  610 DEF PROCmove
  620 PRINT TAB(3+xx1*3,5+yy
  1):" :CHR$9:CHR$9:" "
  630 xx1=xx1-(key$=CHR$137
  )+(key$=CHR$136):yy1=yy1+(x
  x1<0)-(xx1=0):xx1=(xx1+8)MO
  D8
  640 yy1=yy1-(key$=CHR$138
  )+(key$=CHR$139):yy1=(yy1+1
  6)MOD16
  650 PRINT TAB(3+xx1*3,5+yy
  1):"["CHR$9:CHR$9:"":TAB
  (29+xx1,5+yy1):
  660 ENDPROC
  670
  680 DEF PROCinput
  690 PRINT TAB(0,23):"Inpu
  t ";
  700 IF INSTR("Hh",key$) I
  NPUT "Hex "&A$:IF LEN(A$) B
  Z=EVAL("&"+A$)
  710 IF INSTR("Aa",key$) I
  NPUT "Ascii "&A$:BZ=ASC(A$)
  720 PRINT TAB(0,23)SPC(30
  )
  730 key$=CHR$137
  740 IF A$="" ENDPROC
  750 ?(&5000+xx1+yy1*8+OZ)
  =BZ
  760 PRINT TAB(4+xx1*3,5+yy
  1):"BXDIV16:"BXMOD16:TAB(2
  9+xx1,5+yy1):
  770 IF BX>31 AND BX<127 V
  DU BX ELSE PRINT:" "
  780 ENDPROC
  790
  800 DEF PROCsave
  810 PRINT TAB(10,23)": Ar
  e you sure?
  820 REPEAT key$=INKEY$50:
  #FX21
  830 COLOUR1:COLOUR128:PRI
  NT TAB(0,23)"SAVE":COLOUR0
  :COLOUR129:PRINTCHR$9:"DATA
  "
  840 FOR IX=0 TO 2000:NEXT
  850 COLOUR0:COLOUR129:PRI
  NT TAB(0,23)"SAVE":COLOUR1
  :COLOUR128:PRINTCHR$9:"DATA
  "
  860 UNTIL INSTR("YyNn",k
  ey$)>1
  870 IF INSTR("Yy",key$) P
  ROCdisc("write")
  880 PRINT TAB(0,23)SPC(30
  )
  890 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Triangular Circles

Notebook

THIS month's program has the Electron producing a circle made up of triangles, courtesy of the functions RAD, SIN and COS along with a little relative plotting.

```

10 REM CIRCLE OF TRIANGLES
20 REM TREVOR ROBERTS
30 MODE 0
40 VDU 29,640,512:
50 FOR loop= 0 TO 360 STEP 15
60 angle=RAD(loop)
70 x=200*SIN(angle)
80 y=200*COS(angle)
90 PROCtriangle(x,y)
100 NEXT loop
110 END
120 DEF PROCtriangle(x,y)
130 MOVE x,y
140 PLOT 1, 50,50
150 PLOT 1,50,-50
160 PLOT 1,-100,0
170 ENDPROC
    
```

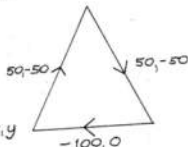
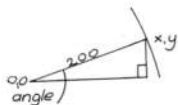
FOR...NEXT
loop cycles
24 times
calling
procedure
each time

procedure
definition

origin to
centre of screen

calculates point
on circle's edge

relative plotting



10,20 Label the program. Everything on a line after a REM is ignored by the micro.

30 Puts the Electron into Mode 0, the two colour, high resolution mode. This uses up a lot of memory, 20k, but since the program is so short it's not a problem.

40 Moves the graphics origin – the zero point for the MOVE and DRAW commands – to the centre of the screen.

50-100 Form a FOR...NEXT loop with control variable *loop*. This cycles 24 times as *loop* goes from 0 to 360 in steps of 15. If this reminds you of your school geometry, full marks. It's no coincidence that there are 360 degrees in a circle.

60 Uses the function RAD to convert the value of *loop* into a number of radians and stores them in *angle*. This is done because the functions COS and SIN work in radian measure, not the more familiar degrees.

70,80 Use SIN and COS to calculate the coordinates of a point on a circle centred on the origin and with radius 200.

90 Calls PROCtriangle using the coordinates calculated in the previous two lines. As the loop cycles each of these pairs of coordinates will be positioned further round the circumference of the circle. The

result is the circle of triangles.

110 Stops the program crashing into the procedure definition.

120-170 Make up the procedure which draws the triangle. When it's called from the main program values are passed to the procedure to use in place of the dummy variables, *x* and *y*.

130 MOVES the graphics cursor to the point *x,y*. Each time the procedure is called *x,y* will be further round the circle.

140 The PLOT 1,50,50 command tells the Electron to draw a line from the present position of the graphics cursor to the point which is 50 units further along the X axis and 50 units further up the Y axis. Notice that these coordinates are relative, not absolute. If the graphics cursor is at *x,y* then PLOT 1,50,50 will move the graphics cursor to *x+50, y+50*.

150,160 Also draw lines using relative plotting. Three lines are drawn and, as the totals of the relative X and Y coordinates are 0 and 0 respectively, they come back to the starting point. A triangle is born!

170 Ends the procedure. Can you write one that produces rectangles or stars or even circles?

Try adding these lines and see what happens to the triangles:

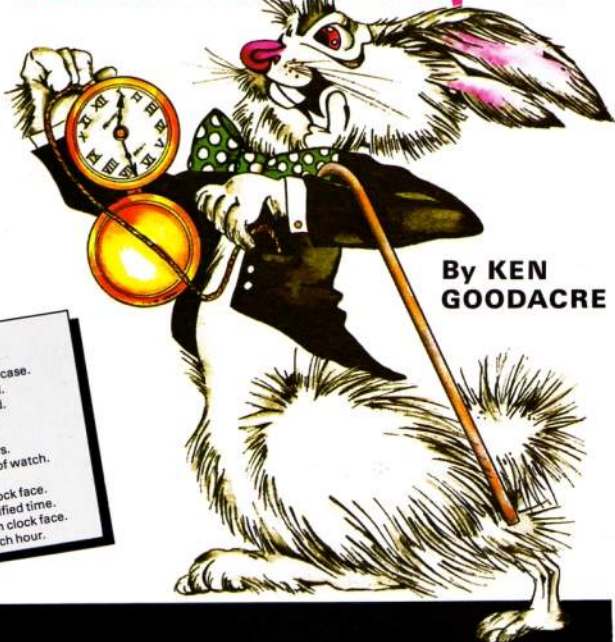
```

44 BCOL 3,3
48 FOR T=1 TO 5
100 NEXT T
100 PROCtriangle(x,y)
    
```

Trevor Roberts

Now you can sit back, relax and enjoy the superbly animated hands as they sweep around the clock face.

TIMEPIECE



**By KEN
GOODACRE**

PROCEDURES

array	Initialises data arrays.
case	Draws sections of the case.
seconds	Updates second hand.
minutes	Updates minute hand.
hour	Updates hour hand.
init	Initialises variables.
error	Traps program errors.
knurl1	Draws knurl at top of watch.
face	Draws clock face.
name	Draws name on clock face.
set	Sets clock to specified time.
reset	Erases hands from clock face.
strike	Sounds chime each hour.

Timepiece listing

```

10REM Timepiece
20REM By K.Goodacre
30REM (C) Electron User
40ON ERROR:MODE6:PROCerr
or:END
50MODE4:VDU23,1;0;0;0;0;
:PROInit
60PRINTAB(10,2)*TIME
-P I E I
70PRINTAB(14,6)*. By
.
80PRINTAB(10,9)*K. G o
o d a c r e
90PRINTAB(14,13)*Please
Wait.
100PRINTAB(4,16)*While A
rrays Are Calculated.....
.
110PROCArray(0.5,0.8,6,0)
120PRINTAB(7,19);B%IC%:
cI=cI+1
130PROCArray(1.6,0.23,12,
1)
140PRINTAB(7,21);B%IC%:
50PROCArray(1.6,0.25,12,
2)
160PRINTAB(7,23);B%IC%:
cI=cI+1
170PROCArray(1.6,0.35,12,
3)
180PRINTAB(7,25);B%IC%:
cI=cI+1
190PROCArray(0.4,0.6,12,4
)
200PRINTAB(7,27);B%IC%:
cI=cI+1
210TIME=0:REPEAT UNTIL TI
ME>=00
220CLS:VDU28,15,7,39,5:VD
U5
230PROCCase(0,1,310,345,6
30,1,1,30)
240PROCCase(0,1,350,340,6
20,1,2,30)
250PROCCase(0,1,130,325,6
30,1,2,30)
260PROCCase(0,1,120,315,6
30,1,2,15)
270PROCCase(15,1,350,340,
620,1,3,30)
280PROCCase(0,2,350,730,3
45,1,0,60)
290PROCCase(0,2,310,730,3
60,1,0,60)
300PROCCase(0,2,300,730,3
60,3,0,60)
310PROCCase(0,1,290,730,3
60,2,0,60)
320PROCCase(0,2,110,715,2
00,4,0,60)
330PROCCase(0,2,95,1160,3
90,1,0,60)
340PROCCase(0,2,60,1125,3
90,3,0,60)
350PROCCase(4,2,330,730,3
55,1,0,6)
360PROCCase(4,2,325,730,3
55,1,0,6)
370PROCCase(0,2,55,1125,3
90,4,0,60)
380PROCCase(0,1,60,1125,3
90,4,4,30)
390PROCCase(15,1,350,340,
620,1,3,30)
400REPEAT:REPEAT:IFINKEY-
1:PROCreset
410UNTIL TIME>=100:TIME=0
:PROCseconds
420IFlagI=1:PROCStrike
430UNTIL FALSE
440:
450DEFPROCArray(tilt,pitch,
step,oneZ)
460BZ=0:FORA=0TO360STEPstepZ
470X=(COS(tilt)*COS(RAD(A
))+SIN(tilt)*SIN(RAD(A))*pi
tch)
480Y=(COS(RAD(A))*SIN(til
t)-SIN(RAD(A))*COS(tilt)*pi
tch)
490IFbneX=0&X0(BZ)=X:ya0(B
Z)=Y

```

Turn to Page 34

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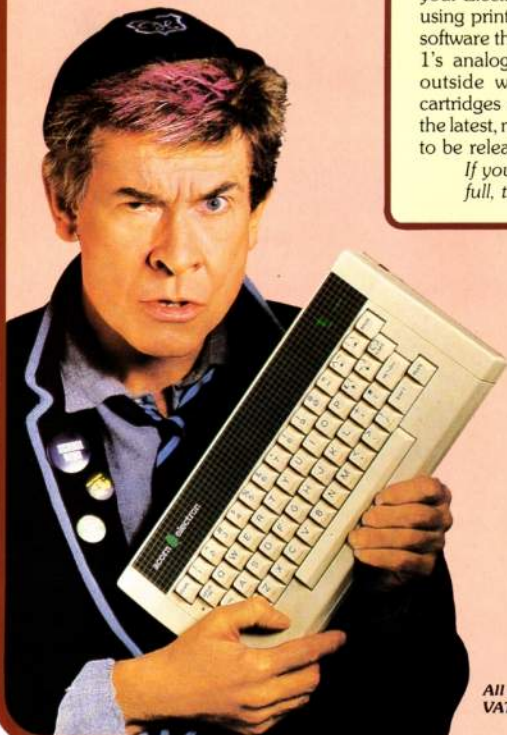
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on Page 61

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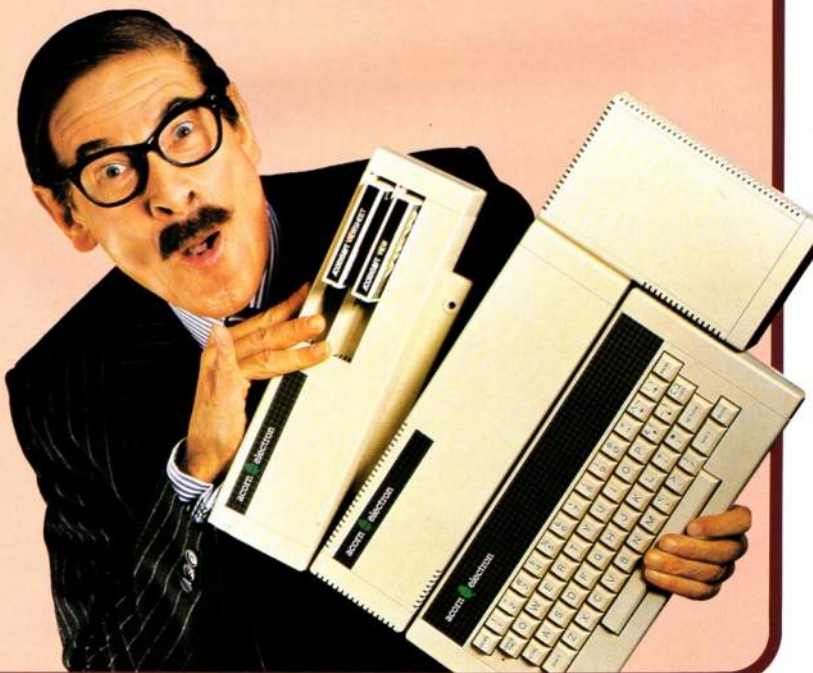
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Electron User price £89.95



From Page 31

```

500IFbneZ=1xal(BZ)=X:yal(
BZ)=Y
510IFbneZ=2xa2(BZ)=X:ya2(
BZ)=Y
520IFbneZ=3xa3(BZ)=X:ya3(
BZ)=Y
530IFbneZ=4xa4(BZ)=X:ya4(
BZ)=Y
540BY=BZ+1:NEXT:ENDPROC
550:
560DEFPROCcase(stI,stepI,
xizeI,xposI,yposI,beqI,neI,
finI)
570IFbeqI=80RbeqI=20RbeqI
=46COL0,WELSEGCOL0,I
580IFbneZ=0MOVEXposI+xize
I:xa0(stI),yposI+xizeI:ya0(
stI)
590IFbneZ=1MOVEXposI+xize
I:xa1(stI),yposI+xizeI:ya1(
stI)
600IFbneZ=2MOVEXposI+xize
I:xa2(stI),yposI+xizeI:ya2(
stI)
610IFbneZ=3MOVEXposI+xize
I:xa3(stI),yposI+xizeI:ya3(
stI)
620IFbneZ=4MOVEXposI+xize
I:xa4(stI),yposI+xizeI:ya4(
stI)
630FORB=stItofinI:STEPstep
I
640IFbneZ=8XI=xposI+xizeI
:xa8(B):YI=yposI+xizeI:ya8(
B)
650IFbneZ=1XI=xposI+xizeI
:xa1(B):YI=yposI+xizeI:ya1(
B)
660IFbneZ=2XI=xposI+xizeI
:xa2(B):YI=yposI+xizeI:ya2(
B)
670IFbneZ=3XI=xposI+xizeI
:xa3(B):YI=yposI+xizeI:ya3(
B)
680IFbneZ=4XI=xposI+xizeI
:xa4(B):YI=yposI+xizeI:ya4(
B)
690IFbeqI=10RbeqI=4DRAWX
I,YI
700IFbeqI=2PLOT69,XX,YY
710IFbeqI=3MOVEXposI,ypos
I:PLOT65,XX,YY
720NEXT:ENDPROC
730:
740DEFPROCseconds
750MOVE785,200:DRAMxI,yI
I

```

```

760MOVE785,200:DRAMxI,yI
I
770MOVExbI-12,ybI+12:VDU2
25
780SI=SI+1:bI=bI+1
790xsI=785+90*xa0(SI)
800ysI=200+90*ya0(SI)
810xbI=785+40*xa0(bI)
820ybI=200+40*ya0(bI)
830MOVE785,200:DRAMxI,yI
I
840MOVE785,200:DRAMxI,yI
I
850MOVExbI-12,ybI+12:VDU2
25
860IFSI=50PROCminutes
870IFSI=60SI=0
880IFbI=60bI=0
890ENDPROC
900:
910DEFPROCminutes
920MOVE729,359:DRAMxI,yI
I
930XI=XI+1:IFI=60XI=0
940xaI=730+290*xa0(XI)
950yaI=360+290*ya0(XI)
960MOVE729,359:DRAMxI,yI
I:GCOL0,0
970MOVE730-12,360+12:VDU2
26:GCOL3,1
980IFI=20RMI=140RMI=260R
MI=380RMI=50PROChour
990IFI=50RMI=280RMI=3550
UN01,1,180,1
1000IFI=50IagI=1
1010ENDPROC
1020:
1030DEFPROChour
1040MOVE731,361:DRAMxI,yI
I
1050HI=XI+1:IFI=60HI=0
1060strikeI=HI+10
1070IFI=55strikeI=5
1080xI=730+230*xa0(HI)
1090yI=360+230*ya0(HI)
1100MOVE731,361:DRAMxI,yI
I:GCOL0,0
1110MOVE730-12,360+12:VDU2
26:GCOL3,1
1120ENDPROC
1130:
1140DEFPROCinit
1150DIMxa0(60):DIMya0(60)
1160DIMxa1(30):DIMya1(30)
1170DIMxa2(30):DIMya2(30)
1180DIMxa3(30):DIMya3(30)
1190DIMxa4(30):DIMya4(30)
1200HI=50:XI=50:SI=50:CI=0
1210RESTORE226:FORA=225TO

```

```

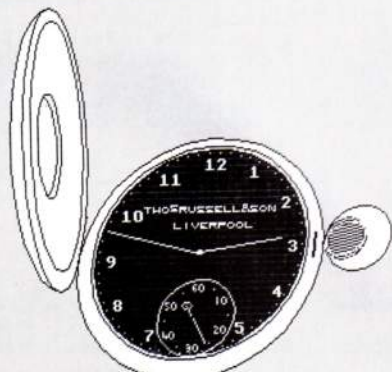
246
1220READB,C,D,E,F,G,H,I
1230VDU23,A,B,C,D,E,F,G,H,
I:NEXT
1240B="Set Up x and y Arr
ay"
1250C=" ok!"
1260ENVELOPE1,2,3,0,0,0,0,
0,0,-1,-1,-1,90,90
1270ENDPROC
1280:
1290DEFPROCerror:VDU14
1300REPORT:PRINT"at line"
;ERI:ENDPROC
1310:
1320DEFPROCnurl:GCOL0,0
1330FORA=344TO408STEP8
1340MOVE1000,A:DRAW1170,A+
20
1350NEXT:ENDPROC
1360:
1370DEFPROCface:GCOL0,0:PR
OCname
1380A=241:CI=1:lnI=51
1390FORB=5TO50STEP5
1400XI=720+260*xa0(B)
1410YI=370+260*ya0(B):MOVE
XI,YI
1420IFCI=7ANDB<20PRINTCH
R$(nI)
1430IFCI=7ANDC<11PRINTCH
R$(9I)+CHR$(mI)
1440IFCI=10CI=1:lnI=48
1450IFCI=7mI=79
1460IFCI=8mI=49
1470IFCI=9mI=50
1480lnI=lnI+1:CI=CI+1:NEXT
1490FORB=0TO50STEP10
1500XI=700+85*xa0(B)
1510YI=220+85*ya0(B):MOVEI

```

```

I,YI
1520PRINTCHR$(A):A=A+1:NEX
T
1530FORB=5TO55STEP10
1540XI=715+90*xa0(B)
1550YI=200+90*ya0(B)
1560PLOT69,XX,YI:NEXT:ENDP
ROC
1570:
1580DEFPROCname:RESTORE163
0
1590X=580:Y=490:FORA=1TO15
:READB
1600MOVEX,Y:PRINTCHR$(X)=X
+24:NEXT
1610X=660:Y=450:FORA=1TO9:
READB
1620MOVEX,Y:PRINTCHR$(X)=X
+24:NEXT
1630DATA235,236,233,239,23
1,234,238,238,230,227,227,2
40,230,233,237
1640DATA227,228,229,230,23
1,232,233,233,227
1650ENDPROC
1660:
1670DEFPROCset:GCOL0,0:fla
gI=0
1680FXI21
1690MOVE730-12,360+12:VDU2
26
1700VDU4:INPUT"HOURS?"HI:V
DU5
1710FHx(10RHI)12hI=12
1720hI=hI+5
1730FHx(10hI)=10hI-hI-10:GOTO1
750
1740FHx(10hI)=hI+50
1750IFSI=30bI=SI-30:GOTO1
770

```




```

1760IFs%<30b%>S%+30
1770GCOLJ,1
1780s%<705+90+xa0(S%)
1790ys%<200+40+ya0(S%)
1800xb%<705+40+xa0(b%)
1810yb%<200+40+ya0(b%)
1820MOVE705,200:DRAWxs%,ys
%
1830MOVE705,200:DRAWxb%,yb
%
1840MOVEhb%<12,vb%>12:VDU2
25
1850m%<730+290+xa0(M%)
1860ym%<360+290+ya0(M%)
1870MOVE729,359:DRAWxm%,ym
%
1880h%<730+200+xa0(H%)
1890yh%<360+200+ya0(H%)
1900MOVE731,361:DRAWhx%,yh
%
1910GCOL0,0:MOVE730-12,360
+12:VDU226
1920GCOLJ,1:REPEAT:PROChou
r:UNTILh%<h%
1930GCOL0,0:MOVE730-12,360
+12:VDU226

```

```

1940VDU4:INPUT*MINUTES?*"m%
:VDU5
1950IFm%<10Rm%>60m%<0
1960IFm%<10m%>m%<10:GOTO1
980
1970IFm%<10m%>m%<50
1980GCOLJ,1
1990IFm%<>50REPEAT:PROCmin
utes:UNTILm%<m%
%
2000GCOL0,0:MOVE730-12,360
+12:VDU226
2010VDU4:INPUT*SECONDS?*"s%
:VDU5
2020IFs%<10Rs%>60s%<0
2030IFs%<10s%>s%<10:GOTO2
050
2040IFs%<10s%>s%<50
2050GCOLJ,1
2060IFs%<>50REPEAT:PROCsec
onds:UNTILs%<s%
%
2070VDU4:PRINT*Press Space
Bar To Start*
2080PRINT*Press Shift To R
eset*
2090REPEATUNTILGET=32:TIME
=0:CLS:VDU5

```

```

2100ENDPROC
2110:
2120DEFPROCreset:H%<50:M%<
50:S%<50
2130MOVE705,200:DRAWxs%,ys
%
2140MOVE705,200:DRAWxb%,yb
%
2150MOVEhb%<12,vb%>12:VDU2
25
2160MOVE729,359:DRAWxm%,ym
%
2170MOVE731,361:DRAWhx%,yh
%
2180PROCset:ENDPROC
2190:
2200DEFPROCstrike:SOUND1,1
,195,1
2210SOUND2,1,177,1:SOUND3,
1,165,1
2220strike%<strike%<5
2230IFstrike%<0flag%<0
2240ENDPROC
2250:
2260DATA0,60,66,129,66,60,
0,0,0,6,56,124,56,0,0,0,0

```

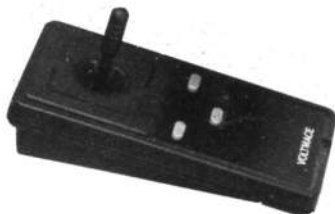
```

,0,0,0,128,128,128,248,0,0
,0,0,32,32,32,32,0,0,0,0,1
76,136,80,32,0,0,0,0,248,1
28,224,248,0,0,0,0,248,248
,144,136
2270DATA0,0,0,0,248,248,12
8,128,0,0,0,0,112,136,136,
112,0,0,0,0,136,136,136,11
2,0,0,0,0,248,32,32,32,0,
0,0,0,136,136,248,136,0,0,
0,0,200,168,168,152,0,0,0,
0,248,128,112,248
2280DATA0,0,0,248,128,112,
248,0,0,0,0,112,80,112,136
,236,0,0,0,140,146,146,146
,148,0,0,0,196,41,73,137,2
30,0,0,0,198,41,233,41,198
,0,0,0,134,137,169,249,36
,0,0,0,230,137,73,41,196,0
,0,0,102,137,201,169,70

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

JOYSTICKS— THE COMPLETE SOLUTION



DELTA 3B SINGLE—BBC B or ELECTRON PLUS 1 £12.00

A single joystick that in some ways can act as two. The custom made special "low noise" potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.



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THOSE of you who have used light pens on the Electron will have discovered their limitation — low resolution. This is because a light pen can only respond to a character-sized cell.

Sometimes this is overcome by introducing a drag factor whereby a cursor is dragged in the general direction the pen is moving, giving the illusion of pixel resolution.

However this can be clumsy, and only works if the pen is moving — not ideal for drafting.

The Tarantula Touch Tablet from Wigmore House works in a similar way to a light pen except that the tablet takes the place of the screen and will give you pixel resolution.

It is small enough to fit neatly beside your Electron, but can easily be moved to a more convenient position as it comes with a metre of flex. It connects into the ADVAL port of the Plus 1.

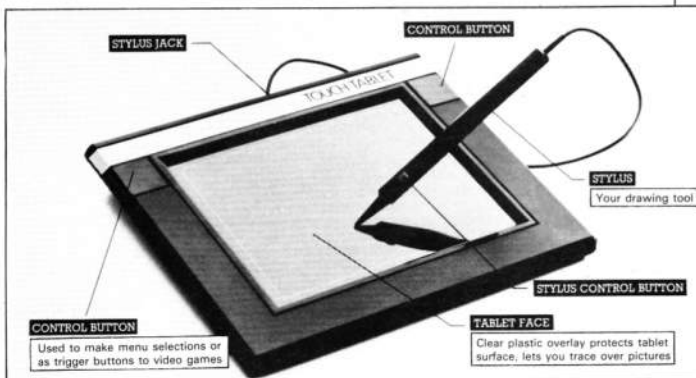
You draw on the tablet with a pen which is connected to it by about half a metre of wire. A button on the end of the pen switches it on and off.

Being triangular rather than round, the pen is easy to hold and the button comfortable to press.

The program accompanying the Tarantula is Mousepaint, the same program used by the Wigmore trackball with a few extensions. (We reviewed the trackball in the October 1985

Try a tablet for pixel resolution

ROBIN NIXON tests the Tarantula Touch Tablet



issue of *Electron User*.)

Mousepaint runs in Mode 1. Down the right hand side of the screen is a menu of icons

and letters showing the options available.

To select from the menu you touch the corresponding area on the tablet with your pen and press the button.

Some of the many options available are listed in the adjoining panel.

Let's follow one of these options through in practice. To draw a rectangle you first move to the rectangle icon and press the switch.

Then move over to one corner of the rectangle and press the switch again.

Now as you move the pen you see a rectangle being dragged about. When you are satisfied with its size and position you press the switch again and the rectangle is fixed in place.

The horizontal/vertical line draw is a nice idea which I used a lot.

You plot two points roughly

where you want a line to be and the program will put the line exactly in place. This is very useful if your hands are still shaking from the night before or you accidentally jerk the pen at the last moment.

The program is so easy to use that the only time you need to touch the keyboard is when you are entering text.

On selection of the text icon a prompt appears in a small window at the bottom of the screen. You then type in your text, press Return, move the pen to where you want the text to go, and press the button.

All in all this is a nice package which has many applications, from designing your own screens and title pages to quite sophisticated technical drawing.

As the software's in Basic and is unprotected you can adapt the Tarantula so that it grows with your needs.

- ★ **Freehand sketching.** What you draw is what you get.
- ★ **Line rubber-banding.** After plotting a start point a line is stretched between it and wherever the pen is positioned until the button is pressed, when the line is fixed in place.
- ★ **Rectangle rubber-banding.** As with line rubber-banding, only producing rectangles.
- ★ **Horizontal/vertical line draw.** A feature to make perfect horizontal or vertical lines out of slightly diagonal ones.
- ★ **Circles.** Where you plot the centre and a point on the circumference.
- ★ **Dotted lines.** As with line rubber-banding but dotted.
- ★ **Text.** This enables you to enter text anywhere you want it on screen.
- ★ **Fill.** A partial fill which may need to be used several times to fill large, complicated shapes.

Some of the options available using the Tarantula Touch Tablet

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ASC

Returns the Ascii code of the string inside the brackets. Hence:

```
PRINT ASC("a")
```

gives 97. Notice that:

```
string$="centigrade"  
PRINT ASC(string$)
```

just gives the Ascii code of the first letter of the string.

STRING\$

Used to create large strings from smaller ones. So if you want a line of 20 asterisks you can use:

```
asterisk$=STRING$(20,"*")  
PRINT asterisk$
```

It's recommended when using a lot of spaces, as it's easier to accurately enter:

```
PRINT STRING$(10," ")
```

than:

```
PRINT "          "
```

though:

```
PRINT STRING$(10,CHR$(32))
```

is even clearer.

CHR\$

Translates an Ascii code into the character it represents. So:

```
PRINT CHR$(65);CHR$(66);  
CHR$(67)
```

gives:

ABC

You can also use the Ascii control codes, so:

```
PRINT CHR$(7)
```

rings the bell while the printer can be turned on and off with:

```
PRINT CHR$(2)  
PRINT CHR$(3)
```

LEN

Provides the answer to the question: "How long is a string?" It gives the number of characters in a string. Hence:

```
PRINT LEN("centigrade")
```

returns 10. Notice that:

```
PRINT LEN("-12")
```

gives the answer 3. The minus sign counts.

STR\$

Turns a number or expression into a string. So if you've got a number 32 and you want it to be a string you use:

```
string$=STR$(32)
```

Notice that it is now a string. You can't do maths with it as you'll see if you try:

```
PRINT string$+2
```


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We're only a local phone call away

The majority of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for direct access via MicroLink to all the other countries belonging to the international Dialcom system.

Telemessages – at a third off

The modern equivalent of the telegram is the telex message. Send it before 10pm and delivery is guaranteed by first post the following day (except Sunday). The service was intended for people phoning their message to the operator, which costs £3.50 for 50 words. But you can now use it via MicroLink, for only £1.25 for up to 350 words! For an extra 65p your message can be delivered in an attractive greetings card.

Go teleshopping on your micro

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Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 11 million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling.

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How much it costs to use MicroLink

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Give the bricklayer his marching orders



ROBIN NIXON presents an entertaining teaching aid for young children

MARCHING Order is designed as an aid to teaching simple numeracy and ordering of numbers between 1 and 9.

The program is in two sections. In the first the pupil is shown a group of numbers which light up in turn.

As each number appears the pupil must press the Spacebar the same number of times. For each press a brick will appear above the number.

Delete can be used if too many bricks are chosen and

Return confirms selection.

In the second section the pupil must place the numbers in the correct order to enable a man to march up the bricks.

To arrange the bricks in the correct order the pupil presses the Spacebar until a man appears under the lowest number. The bricks above this number then re-position themselves at

the bottom of the screen when Return is pressed.

When all the bricks have been re-positioned in the correct order the pupil is rewarded with a short animated sequence.

At the end of each game

the selection menu is re-displayed so that you can change the level of difficulty should you wish to do so.

Marching Order listing

```
100 REM*****
110 REM*
120 REM* MARCHING ORDER *
130 REM*
140 REM* By Robin Nixon *
150 REM* (c) Electron *
160 REM* User *
170 REM*
180 REM*****
190 REM
200 IF PAGE=0 THEN GOT
240
210 *KEY*CLS:FX3,21M*.
IMFORX=PAGE TO TOP STEP4:
(000+X-PAGE)=X:NEXT:PAGE
E=000:MOD:NRUNIM"
220 *FX139,0,128
230 END
240 *FX3,0
250 *FX16
260 MODE2:VDU23;8202;0;0;
0;19,0,5,0,0,0,19,4,6,0,0,0;
:PROCINdouble:PROCtitle
270 LDZ=1:DIM BZ(9),CX(9)
:VDU 23,241,255,255,255,255
255,255,255,255,23,242,56,
56,146,124,16,48,48:REPE
ATUNTILINKEY(-99)=0:FX20
280 MODE1:VDU23;8202;0;0;
```

```
*ORDER*:FOR NX=0 TO LEN(A$)
-1:PROCdouble(NX*160+260,82
0,NX MOD 4+1,16,MID$(A$,NX+
1,1)):NEXT
360 PROCReveal:ENDPROC
370 DEFPROCbackground:FOR
XX=0 TO 15:VDU 19,XX,XX-0,
0,0,0:NEXT:FOR XI=6 TO 7:VD
U 19,XX,0,0,0:NEXT:CX=5:F
OR XI=640 TO 0 STEP -8:BCOL
0,CX:CX=CX+1:IF CX=8 CX=5
380 MOVE XX,0:DRAW 1280-X
I,639:MOVE XX,639:DRAW 1280
-XX,0:NEXT:FOR YI=320 TO 4
STEP -4:BCOL 0,CX:CX=CX+1:
F CX=8 CX=5
390 MOVE 0,YI:DRAW 1279,6
40-YI:MOVE 1279,YI:DRAW 0,6
40-YI:NEXT:ENDPROC
400 DEFPROCReveal:COLL1,0
:FOR YI=640 TO 0 STEP -4:MO
VE 0,YI:DRAW 1279,YI:NEXT:C
OLOUR 4:VDU 31,13:PRINT"B
y Robin Nixon":COLOUR 1:VDU
31,4,38:PRINT"Press Space
":REPEAT:FOR XI=1 TO 3:OSCL
1*FX19:ON XI GOT 410,420,
430
410 VDU19,13,1,0,0,0,19,1
```

Marching Order listing

From Page 41

must press the "Space Bar" the corresponding number of "times. For each press a brick will appear above the number. "j"

500 PRINT "Delete can be used if too many bricks are chosen and Return enters a selection." : COLOR 1 : PRINT "In the second place the pupil must place these numbers in the correct order to enable a man to march up"

510 PRINT "the bricks." : VDU 31,14,31 : COLOR 1 : COLOR 130 : PRINT "PRESS SPACE" : REPEAT UNTIL GET=32 : COLOR 128 : 520 PROCHeader : COLOR 128 : COLOR 2 : PRINT "To arrange the columns of bricks in the correct order the pupil presses the Space Bar until a man appears under the lowest number. The bricks above this"

530 PRINT "number then re-position themselves at the bottom of the screen when Return is pressed." : COLOR 3 : PRINT "When all the bricks have been re-positioned in the correct order the pupil is rewarded with a short animated"

540 PRINT "sequence." : COLOR 1 : PRINT "At the end of each game the difficulty selection menu is re-displayed to allow the level to be changed."

550 VDU 31,14,31 : COLOR 1 : COLOR 130 : PRINT "PRESS SPACE" : REPEAT UNTIL GET=32 : REPEAT UNTIL GET=32 : ENDPROC

560 DEFPROCBox : 570 VDU 23,240,255,213,171,213,171,213,171,255 : VDU 28,0,38,19,0 : COLOR 129 : CLS : VDU 26 : COLOR 2 : COLOR 133 : PRINTSTRINGS(28,CHR\$240) : FOR Y=1 TO 29 : VDU 31,0,Y : PRINTCHR\$240 : VDU 31,19,Y : PRINTCHR\$240 : NEXT Y : PRINTSTRINGS(28,CHR\$240) : ENDPROC

580 DATA "E Easy 1-3"
590 DATA "A Average 1-5"
600 DATA "H Hard 1-7"
610 DATA "V Very hard 1-9"
620 DATA "I Instructions"

630 DEFPROCSelect : 640 COLOR 128 : PROCHeader : COLOR 2 : VDU 31,1,18 : PRINT "Press E,A,H,V or I then Space to play"

650 RESTORE 580 : FOR IX=1 TO 5 : READ A\$: IF LDI=IX : COLOR 1 : COLOR 135 ELSE : COLOR 7 : COLOR 128 : 660 *FX15,1 : 670 VDU 31,12,IX*2+3 : PRINTA\$: NEXT IX : REPEAT IX=INSTR("E A H V I",GET) : UNTIL IX=0 : SOUND 1,-8,150,1 : IF IX=5 : PROCInstructions : GOTO 640 ELSE : IF IX=6 : REPEAT UNTIL INKEY(=99) : ENDPROC ELSE : LDI=IX : GOTO 650

680 DEFPROCCount : LLI=LDI : 2+1 : FOR IX=1 TO LLI : BX(IX)=IX : NEXT IX : FOR IX=1 TO LLI : 2+R : IX=RD(11) : R2X=RD(11) : R3=BX(11) : BX(11)=R2X : R2X=R3 : NEXT IX : COLOR 4 : COLOR 129 : FOR IX=1 TO LLI : VDU 31,(20-LLI)/2+IX-1,14 : PRINTBX(IX) : NEXT IX : LLI=(20-LLI)/2-1 : FOR IX=1 TO LLI : COLOR 2 : COLOR 133 : VDU 31,LLI+IX,14,14,14 : NEXT IX

700 ZX=0 : REPEAT : 710 REPEAT UNTIL INKEY(=99) OR INKEY(=74) OR INKEY(=90) : IF INKEY(=74) SOUND 1,-4,60,1 : 720 IF INKEY(=99) AND ZX<10 : ZX=1 : FOR JZ=1 TO 14 : ZX : PROCBrick(LLI+ZX,JZ) : PROCwait : PROCerase(LLI+ZX,JZ) : NEXT JZ : PROCBrick(LLI+ZX,JZ-1) : 730 IF INKEY(=98) AND ZX<8 : FOR JX=14-ZX TO 1 STEP -1 : PROCBrick(LLI+ZX,JX) : PROCwait : PROCerase(LLI+ZX,JX) : NEXT JX : ZX=1

740 REPEAT UNTIL INKEY(=99) OR AND INKEY(=98) : 750 UNTIL INKEY(=74) : IF ZX<8 : BX(IX) : FOR JZ=1 TO 13 : PROCerase(LLI+ZX,JZ) : NEXT JZ : GOTO 700

760 COLOR 4 : COLOR 129 : VDU 31,(20-LLI)/2+IX-1,14,14,14 : NEXT IX

770 NEXT : ENDPROC : 780 DEFPROCWait : ENDPROC : 790 DEFPROCBrick(IX,XZ) : SOUND 1,-4,115+5+150 : XZ+1 : 800 : COLOR 134 : VDU 31,IX,XZ,240 : ENDPROC : 810 DEFPROCerase(IX,XZ) : COLOR 1 : VDU 31,IX,XZ,24 : ENDPROC

810 DEFPROCOrder : COLOR 1 : VDU 31,8,24,14 : FOR IX=1 TO 5000 : NEXT IX : FOR IX=0 TO LLI : 1 : COLOR 0 : VDU 31,IX,29,24 : 42 : FOR YZ=1 TO 500 : NEXT YZ : VDU 31,IX,29,24 : NEXT YZ : COLOR 0 : VDU 31,IX,29,24 : 820 : FOR IX=1 TO 9 : CX(IX)=0 : NEXT IX

830 ZX=0 : IX=1 : NX=1 : 840 REPEAT : 850 REPEAT : 860 REPEAT : IF CX(IX)=1 : COLOR 1 : VDU 31,LLI+ZX,15,24 : 1 : IX=IX+1

870 IF ZX<11 : IX=1 : 880 UNTIL CX(IX)=0 : 890 COLOR 6 : COLOR 129 : VDU 31,LLI+ZX,15,24 : REPEAT UNTIL INKEY(=99) : REPEAT UNTIL INKEY(=99) OR INKEY(=74) : SOUND 1,-8,150,1 : IF INKEY(=99) : COLOR 1 : VDU 31,LLI+ZX,15,24 : 1 : IX=1 : GOTO 860

900 UNTIL INKEY(=74) : IF BX(IX)<NX : GOTO 850 : 910 FOR ZX=BX(IX) TO 1 STEP -1 : FOR JZ=14-ZX TO 1 STEP -1 : PROCBrick(LLI+ZX,JZ) : PR

OCwait : PROCerase(LLI+ZX,JZ) : NEXT JZ : FOR JZ=LLI+ZX TO 10 : PROCBrick(JZ,1) : PROCwait : PROCerase(JZ,1) : NEXT JZ

920 FOR JZ=1 TO 16 : PROCBrick(18,JZ) : PROCwait : PROCerase(18,JZ) : NEXT JZ : FOR JZ=18 TO LLI+BX(IX) STEP -1 : PROCBrick(JZ,16) : PROCwait : PROCerase(JZ,16) : NEXT JZ

930 FOR JZ=16 TO 20 : (BX(IX)-ZX) : PROCBrick(LLI+BX(IX)-ZX) : PROCwait : PROCerase(LLI+BX(IX)-ZX) : NEXT JZ : PROCBrick(LLI+BX(IX)-ZX) : NEXT JZ : CX(IX)=1 : NX=NX+1 : UNTIL NX=LLI+1 : 940 COLOR 4 : COLOR 131 : FOR JZ=LLI+BX(IX)+1 TO 18 : VDU 31,JZ,30 : (BX(IX)-ZX) : 240 : FOR LX=1 TO 3 : PROCwait : NEXT LX

950 NX=29 : COLOR 129 : FOR JZ=LLI+BX(IX) : COLOR 0 : VDU 31,JZ,24 : FOR LX=1 TO 3 : PROCwait : NEXT LX : 1 : VDU 31,JZ,24 : 1 : NX=NX-1 : NEXT LX : COLOR 0 : VDU 31,JZ,NX+1 : 24 : COLOR 1

960 VDU 31,19,29 : (BX(IX)-ZX) : 24 : FOR LX=1 TO 5000 : NEXT LX : FOR JZ=LLI+BX(IX)+1 TO 19 : COLOR 0 : VDU 31,JZ,29 : (BX(IX)-ZX) : 24 : FOR LX=1 TO 3 : PROCwait : NEXT LX : COLOR 1 : VDU 31,JZ,29 : (BX(IX)-ZX) : 24 : NEXT LX : COLOR 0 : COLOR 129

970 VDU 31,19,29 : (BX(IX)-ZX) : 24 : FOR LX=0 TO 5000 : STEP 129 : VDU 19,RND(7),RND(7),0,0,0,19,RND(7),RND(7),0,0,0 : SOUND 1,-8,IX,1 : NEXT VDU 2 : FOR ZX=1 TO 10000 : NEXT : ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 61.



Off into the sunset - with a blast



YOU may remember my asking in November's column whether anyone had managed to get out of the repository in *Classic Adventure*.

Well H. Bastien has written in to say how it can be done, thus earning himself a copy of Pettigrew's Diary.

Go to the second room of the repository and get the black rod. Take it to the first room and drop it.

When you are back in the second room type in **BLAST**. Some elves will carry you off into the sunset.

Neither of us can figure out why this should work, but it does.

This is obviously not the end of the game as it can be done with only 14 treasures. Has anyone managed to solve it yet?

Peter Bailey and Ian Horsham say that the following BBC games work on the Electron - *Escape from Pulsar 7*, *Ten Little Indians* and *Secret Mission*.

Brian Rodwell wants to know if I have considered writing a book of hints and tips for frustrated adventurers. Does anyone else think this would be a good idea?

R. Henderson has sent in a tip for *Adventure*. He says that it is easy to press the Escape key by accident and that typing *FX229, 1 will disable it.

This is obviously a good tip for any program that doesn't disable the Escape key.

Paul Campbell wants to

know whether *Terrormolinas* from Melbourne House is available for the Electron. The version released is suitable for both the BBC Micro and the Electron.

Several people have written in over the last couple of months about Rog Frost's review of *Groedy Dwarf*.

Lou Carey doesn't agree with Rog and writes that he finds the game slow and awkward to play.

Martin Beint, on the other

hand, agrees with Rog and goes on to say that it was this game that first got him hooked on adventures.

The whole point of a review is to give readers a critical, informed, but above all fair opinion about a piece of software.

However it is still one person's opinion, and as such is not going to please everybody.

Stuart Kelly and Geoff Larsen both feature in the Hall

of Fame this month. Stuart, judging by his 52,680 high score on *Snapper*, is as much at home with arcade games as adventures, and Geoff is an ex-Spectrum and ZX-81 adventurer who has now bought an Electron and is avidly devouring the games available.

CORNER PROBLEM

Before we look at some answers to readers problems, I have had a couple of letters recently that have caused me to ask those of you who write in to make sure that you are precise about the help you want and the way you ask for it.

One letter from a reader in Northants proved to be mainly illegible. Another asked for help with five adventures but didn't tell me where he was stuck, and yet another asked me if I could help but neglected to mention the adventure.

I welcome letters from anybody, but, please, if you have a question, make sure you give me as much information as possible.

Tony Bevan asks for help with *Repton*. He wants to know all the passwords and threatens to throw the game away if I don't tell him.

The passwords are Chameleon, Terrapin,

FEEDBACK

J. Scott writes, following Helen William's problems with *Manic Mole*, that she should leave out line 1070, which stops the screen becoming invisible and that leaving out line 1250 stops the girders melting in screen 4.

Matthew Pycroft has written in to answer Carl Marlow's problem with *Fighter Pilot*. Apparently accelerating and pressing the UP key works 50 per cent of the time, and if this fails he can always press Caps Lock and invoke the automatic landing approach option.

Matthew goes on to give some tips for *Crown Jewels*. There is no Telecom Tower location, use TORCH ON in the Chamber of Horrors and you cannot attract the attention of the policeman or tower guard.

Lou Carey gives fuller information on the toad poisoning in *Galadriel in Distress*:

- To get the toad out of the pond you must examine the cake to get the fly and then FEED FLY TO TOAD.
- To find the antidote to the toad poisoning you must examine the pond and pull the plug. Once the pond has drained you should examine it again to find the bottle. If you examine the bottle and the goblet you will find they both have writing on. Take both of them to the loremaster for deciphering.

The secret is that both are poison and that to nullify them you have to drink from both at the same time. Try DRINK FROM BOTTLE AND GOBLET.

From Page 43

Sidewinder, Gecko, Python, Salamander, Iguana, Cuttlefish, Octopus, Giant Clam and The Kraken.

Incidentally, I managed to solve all the screens in this game but I still can't believe it's possible to do so without losing a life.

David McGloin has written in with questions about three adventures. The stars in **Philosophers Quest** are just an indication of nearby danger and can otherwise be ignored.

In the **Eye of Zoltan** the gloves are hidden in the wizard's bedroom. You use the password in the secret passage with the keys to get out of the castle.

In **Spiderman** use the computer to start the presses.

G.B. Lambert wants to know where the orb is in **Crown Jewels**. I haven't seen the game yet, but as far

SOS

Michael Peters would like to know how to get back to the ship once you have the treasures and how to translate the writing on the boulder in **Strange Odyssey**.

R. Henderson is having problems with **Alligata's Nightworld**. He says the instructions are very vague and that he can't find the

secret rooms and passages or replenish his energy.

Tony Haynes wants to know how to read the stone tablet on the river bed in **Staff of Law**.

Martin Beint has the same problem as me in **Five Stones of Anadon**. Where is the cross to exorcise the ghost? Can anyone help us?

as I know the orb is inside one of the waxworks. Use the matches and you should find it.

Paul Campbell has found that he can't get into the hole in the side of the chasm in **Greedy Dwarf**. Use the chain and choose the right direction.

Michael Peters can't get out of the pit or the tank in **Mystery Fun House**. Use the trampoline and give the mermaid something for her

hair and then drain the water out.

Philip Stout has some questions about **Pettigrew's Diary**. How do I get into the underground station? You can't!

What do I do with the Japanese tourists? You have to do two things. When you meet the tourist on his own you should take his map and read it.

Later on you will meet a

party of tourists. You will get some money and a camera from them if you tell them where you saw their friend.

Martin Beint has found everything except the pirate's chest in **Classic Adventure**. From the west end of the hall of mist go: S, E, S, S, N, E, E, NW.

Nick Southgate wants to know how to dock in **Super Agent Flint**. You don't! But if you have the suit and helmet and can insert the right disc into the computer you will be able to blast off and finish the game.

Nick also wants to know how to get past the slug in **Blue Dragon**. I managed to complete the game without finding a way past it, or into the cave, so I assume you can't do either.

Andrew Spratling can't find the time crystal in **Stranded**. Assuming you have already found the radiation suit, you should go S, E, E, S, S from the control room of the Tardis.

HALL OF FAME

Philosophers Quest - Stuart Kelly

The treasures: ruby, amulet, brass trophy, silver chain, ancient book, ivory tusk, gold tooth, jewelled platypus, treasure chest, filigree slipper, cheque, stuffed albatross.

Important locations: Curly passage, room full of holes, philosopher's room for contemplation, elephant's graveyard, whale's mouth, thin E-W corridor, octopus' room, sea cupboard, solicitor's office after dropping will, albatross room.

The dogs:

- Past the elephant's graveyard.
- Spot is in the bare cell past the danger room.
- Go to kennel room, get the dog and then go under the paint dropper to make it visible.

The danger room: JUMP NORTH, CRAWL NORTH, HOP SOUTH, RUN SOUTH.

The albatross: Go to the worker in the M.E. passages.

The octopus: Throw a bottle of ink.

The whale: Drop the driftwood and set fire to it by the gold tooth.

The portcullis: Rub amulet.

The mouse: Get the gorgonzola cheese if you are wearing a gas mask.

The elephant: Carry the mouse.

Sorcerer of Claymogue Castle - Geoff Larsen

M. Tiplady has not solved as much of the game as he thinks. The answer to his problems are:

Stars are stored inside a tree in the forest.

There are two odd feelings. One as you age and one as you grow younger. The two must balance each other. The spell of Methuselah makes you grow old and the Fountain of Youth has the opposite effect. If the effect of one outweighs the other then you die and the game is over. A DRY towel wipes away the water droplets of youth.

You do not open the loft in the ballroom. The loft is reached by

casting the correct spell while standing on the fallen chandelier.

The stone door is opened by casting the seed spell.

Invisibility is the key to entering the dragon's lair.

The oak door does not need to be opened.

In response to Julian Holden and Matthew Hall's problems:

To get through the stone door you need the seed spell. To enter the castle without using the spell, enter the moat and HOLD BREATH, SWIM DOWN, SWIM DOWN, SWIM EAST.

To get the can from the battlements you must throw the firebrick. A helping hand to do this can be acquired across the lava through the stone door.

Gremlins - Geoff Larsen

The electric drill is used to drill a hole in a metal plate which has been welded across the smashed vent in the hardware department.

The hacksaw is used to cut two pipes. One pipe is behind the bar in Dorry's tavern and the other is attached to the gas bottle.

In the pub K. and D. Harper should go behind the bar.

The mail box can be cut up into metal pipes using the welding torch, once you have coaxed Stripe, the worst of the gremlins, out of the box.

The film show at the cinema is handy for keeping the gremlins occupied while exploring the rest of the town.

Giles Harris should examine the counter to get the tape that will enable him to attach the gas bottle pipe to the whole in the metal pipe.

Circus - Geoff Larsen

In answer to David Anderson's problems:

Repair the generator and then you can syphon out the petrol with the snorkel.

You need a bar to prise open the door when trying to get into the wagon. The bar is reached by walking across the tightrope. Some soft shoes found inside the chest will help here, and if you can't open the chest you will need to give it a good kick.

MATHS WORKOUT

**MIKE BIBBY continues his exposé
on how the Electron does its sums**

EOR's a way to spot who's telling the Exclusive truth

IN the last article we looked at the AND and OR operations on binary numbers—logical operations, as they are known. These were simply rules for combining numbers bit by bit. We shall continue our exploration this month with a look at the EOR operation.

EOR stands for Exclusive OR—sometimes people call it XOR. Either way it's the same thing. EOR is a variant on the way we normally use the term OR.

For example, if I say: *Mike OR Pete wears glasses* this is true if Mike wears glasses, OR Pete wears glasses, OR both Mike and Pete wear glasses.

Now it's this last case of OR we're interested in, where they both wear glasses. EOR works just like OR up to this point. However, EOR does not "allow" both of them to wear glasses. Either one does, or the other, but not both.

To put it another way, the one who wears the glasses does so *exclusively*.

If both are wearing glasses then while:

Mike OR Pete wears glasses would be true,

Mike EOR Pete wears glasses would be a downright lie!

We could signify that a statement is true with the letter T, and use F for false. At school our teachers used ticks for truth and crosses for false. Since we're using computers, though, we'll use numbers: 1

will denote true and 0 will denote false. We've chosen 1 and 0 because they fit in so well with the binary system.

So, in the above example, if Mike has glasses we can give Mike the value 1. If Pete hasn't glasses we can give Pete the value 0.

Table I shows the idea, applied to each combination of spectacle user. The ones and zeros are known as truth values, states or conditions.

As you can see, there are four possible cases as far as Mike and Pete wearing glasses are concerned: neither can wear them as in case 1, where both Mike and Pete has 0 value. Then again, Pete may wear them (1) whereas Mike does not (0), case 2, and so on. If you look carefully at the

numbers involved in all four cases, you see that we've got four pairs of bits we can combine.

Each pair of bits is made up of the "truth bit" for Mike and the "truth bit" for Pete.

What I've done in Table II is to combine these pairs for all four cases in accordance with our OR rules. We've stored the result in a third column.

We call such a table a Truth Table. In this case, it's the truth table for OR. We can use it to work out the result for any OR combination of two bits.

All we have to do is to find the row that starts with the two bit values we're combining and then look in the third

	Wears glasses		
	Mike	Pete	
Case 1	0	0	neither wears glasses
Case 2	0	1	Pete wears glasses
Case 3	1	0	Mike wears glasses
Case 4	1	1	Both wear glasses

Table I: Truth values

Mike wears glasses	Pete wears glasses	Mike OR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	1

Table II: OR truth table

From Page 45

column for the result.

Table III shows a similar table for:

Mike AND Pete wear glasses

Again the first two columns are identical, covering all four possible cases. The third column combines them according to the AND rules.

Look again at Table II. This corresponds in a sense to our binary rule for OR: you get a 1 if either or both bits you combine contain a 1.

However if when talking about Mike and Pete you mean OR in the exclusive sense, EOR, then the combination of Mike wearing glasses and Pete also wearing glasses would have to be false.

This is because EOR means either one or the other wears glasses, but not both – it's *exclusively* one or the other.

If we do mean EOR in this exclusive sense we'd write our statement about them as:

Mike EOR Pete wears glasses

Its Truth table is given in Table IV:

If you look at each case, you'll see that the only time Mike EOR Pete is true is when either one or the other wears glasses, but not both (or neither).

More formally, if both bits are 0, or both bits are 1 the result is 0. If either is 1 and the other is 0 the result is 1.

To put it another way, if the bits are identical the result is 0, otherwise the result is 1.

Let's have a look at how we EOR binary pairs of numbers. It's the same as for OR and

AND – just apply the rules for EORing to each pair of bits in succession. For example:

```

110110110
EOR 111100101
gives 101010011
    
```

Take a look at what happens when you EOR a number with zero:

```

110110110
EOR 100000000
gives 110110110
    
```

that is, when you EOR a number with zero it leaves that number unchanged. Also something interesting happens when you EOR a number with itself:

```

110110110
EOR 110110110
gives 100000000
    
```

Whenever you EOR a number with itself, the result is zero. This is as it should be: remember, when you EOR two

identical bits the result is zero.

Now EOR has a property which makes it quite useful – let's look what happens when we take a number, EOR it with a second number and then go on to EOR the result once more with that second number.

```

First number 110110110
Second number EOR 101101000
Result        111001011
Second number EOR 111001011
Final result  110110110
    
```

As you can see, the first number has magically re-appeared! This always happens when you EOR twice with the same number as, in a sense, the two EORings cancel each other out.

Table V summarises the process for all four possible pairs of one-bit numbers.

As you can see, for all the cases the final resulting bit (when the first bit has been EORed twice with the second) is identical to the first bit.

Another way to think of it is that we are doing:

first number EOR second number EOR second number

Taking the underlined part first, we've already seen that any number EORed with itself gives a zero result. So what we're really doing is:

first number EOR 0

which, as we've also seen, must leave just the first number, since EORing with

zero leaves a number unchanged.

All this may seem rather abstruse, but actually it's quite useful. In fact we tend to use AND, OR and EOR quite often in graphics, particularly in animation.

To simulate movement we frequently print something on the screen, then after leaving it there for a while to register on the eye, we blank it out and print it in a new position and so on.

Sometimes we blank the character out by printing it again in the same place but in the background colour.

We can, however, use EOR. If we use EOR to place our character on the screen – never mind exactly how for the moment – when it comes to wanting rid of it, we can just repeat ourselves.

That is, we just EOR the character on again. As we've seen, the effect of two EORs is to cancel each other out. In this case, they cancel out to the original background – and the character disappears.

Don't worry too much about the details, I just want to convey the general idea.

The point is, logical operators, as AND, OR and EOR are known, can be invaluable to both the Basic and machine code programmer.

● *Next time we'll continue our series with a brief look at the idea of masks.*

Mike wears glasses	Pete wears glasses	Mike AND Pete wear glasses
0	0	0
0	1	0
1	0	0
1	1	1

Table III: AND truth table

Mike wears glasses	Pete wears glasses	Mike EOR Pete wears glasses
0	0	0
0	1	1
1	0	1
1	1	0

Table IV: EOR truth table

First bit	Second bit	Result 1st EOR	Second bit again	Result 2nd EOR
0	0	0	0	0
0	1	1	1	0
1	0	1	0	1
1	1	0	1	1

Table V: Combined truth tables



Find and replace that string

WHEN writing fairly long programs I often find that I'm not sure whether I've used a certain variable name before, or of the exact whereabouts of a particular procedure.

I also use long variable names for the sake of clarity, which occasionally cause the dreaded No Room error.

For these reasons I wrote Find and Replace – which is really two programs rolled into one.

The first part, Find, will go through an entire Basic program highlighting any occurrences of the string being searched for.

The second part, Replace, replaces any occurrences of the search string with another string.

When called, Find and Replace prompts you with the question *FIND?* to which you enter the string you are looking for. You are then prompted with *REPLACE?*

If you press Return at this point, Find and Replace will begin to search through the program without replacing anything. If, instead of pressing Return, you enter a string you are then prompted with the question *GLOBAL?*

If you answer yes to this, Find and Replace goes ahead and automatically changes every occurrence of the search string with the replace string. Otherwise each occurrence will be highlighted in turn and the computer will wait for you to type Y or N for whether or not you want to replace.

The way it works is really

Ever tried to find a particular string in a long, long listing? With this search utility by ROBIN NIXON your micro will do the chore for you

quite simple, although you coding is a little tricky. As you may know, in BBC Basic each program line is stored in a tokenised form.

This means that keywords such as FOR, NEXT and THEN each have a corresponding single character which is substituted for the keyword itself. This is done to make program execution easier and faster and to enable longer programs to be typed in.

Because the lines are tokenised it is not possible to compare a search string with sections of a program line because they are not in the same format. So immediately after you enter search or replace strings the utility tokenises them so that they are of the same format.

Next, the program takes each line in turn and checks whether or not the search string is contained in it – in much the same way as INSTR works. If so it records the number of times and where the matches occur.

Having done that, if you have not selected the Replace option each occurrence is highlighted while the program waits for a key press. This continues until the end of the program is reached or you

press Escape.

If you have selected the Replace option the line is copied, bit by bit, into a buffer at &700 with each search string being substituted where required by a replace string.

The new line now held in &700 – which is the keyboard input buffer – is then entered into your program as if it had been typed in at the keyboard.

As it stands Find and Replace tucks itself in just under HIMEM in Mode 6. Therefore if you later change mode it will be wiped out. This is fine if you only need temporary use of the utility.

But if your Electron is cassette-based and you wish to keep Find and Replace resident in memory, the simplest thing to do would be to set PAGE to &1200 and then load Find and Replace by typing:

**PAGE=&1200
LOAD "FINDREP"**

assuming of course, that it has previously been saved as FINDREP. Then change the value of START in line 210 to &E00 and run the program.

If you have a disc-based Electron and want to keep the utility resident in memory –

and don't mind losing use of the function keys – just change START to &900 and run the program.

In each of these cases the object code will be saved either to tape or disc as FR.

Whenever you need to use Find and Replace in the future *LOAD FR and, depending on the value START was set to when FR was assembled, type one of the following:

**CALL &900
CALL &E00
CALL &5000**

&900 is for disc users only. &E00 is if you wish to keep Find and Replace resident in memory and &5000 is the default if you don't change the listing.

When using this utility always ensure that you have saved the program you are working on as you may accidentally change something you don't wish to.

For example, if you changed all occurrences of IF to : you could not then change all occurrences of : to IF and still have a working program – you would then have no statement separators.

Also, if you have a fairly long line and start replacing small chunks of it with larger ones, it may end up longer than the maximum 255 characters allowed. In this case your line will finish up being garbled.

**Full listing starts
on Page 48**

From Page 47

```

100 REM *****
110 REM *
120 REM * FIND REPLACE *
130 REM *
140 REM * By R.Nixon *
150 REM *
160 REM * (c) Electron *
170 REM * User *
180 REM *
190 REM *****
200 REM
210 MODE 6:START=45000
220 FOR PASS=0 TO 3 STEP3
230 PT=START
240 [
250 OPT PASS
260 \
270 .start
280 \
290 SEI
300 LDA #F4
310 CMP #10
320 BEQ basic
330 CMP #11
340 BEQ basic
350 PLA
360 PLA
370 \
380 .basic
390 \
400 LDA #10
410 STA #F4
420 STA #FE05
430 CLI
440 LDA #0
450 STA #6
460 LDA #00
470 STA #7
480 JSR #BFCF
490 EQU 22
500 EQU 6
510 EQU "FIND & REPLACE"
520 EQU 10
530 EQU 10
540 EQU 13
550 EQU "Find? "
560 LDA #0
570 STA #word
580 JSR input
590 LDA #0
600 JSR token
610 LDA #600
620 CMP #13
630 BEQ start
640 JSR #BFCF
650 EQU 13

660 EQU "Replace? "
670 LDA #440
680 STA #word
690 JSR input
700 LDA #0
710 STA #80
720 LDA #640
730 CMP #13
740 BEQ noglob
750 LDA #440
760 JSR token
770 JSR #BFCF
780 EQU 13
790 EQU "Global? "
800 LDA #0
810 JSR #FE00
820 BCC notesci
830 JMP escape
840 \
850 .notesci
860 \
870 JSR #FEE
880 STA #80
890 \
900 .noglob
910 \
920 JSR #FEE7
930 JSR #FEE7
940 LDA #10
950 STA #74
960 LDA #0
970 STA #73
980 STA #78
990 \
1000 .check
1010 \
1020 LDA #78
1030 CMP #FF
1040 BNE cont
1050 RTS
1060 \
1070 .cont
1080 \
1090 JSR incprog
1100 CMP #FF
1110 BEQ alldone
1120 STA #82
1130 JSR incprog
1140 STA #81
1150 JSR incprog
1160 STA #83
1170 LDA #73
1180 STA #78
1190 LDA #74
1200 STA #79
1210 LDA #0
1220 STA #84
1230 STA #85

1240 STA #70
1250 STA #75
1260 STA #76
1270 STA #77
1280 LDA #1
1290 STA #89
1300 STA #86
1310 \
1320 .compare
1330 \
1340 INC #75
1350 JSR incprog
1360 STA #71
1370 LDY #70
1380 CMP #600,Y
1390 BNE nomatch
1400 CMP #13
1410 BEQ endline
1420 LDA #84
1430 BNE nocopy
1440 LDA #75
1450 STA #84
1460 \
1470 .nocopy
1480 \
1490 INC #70
1500 LDY #70
1510 LDA #600,Y
1520 CMP #13
1530 BEQ match
1540 JMP compare
1550 \
1560 .nomatch
1570 \
1580 LDA #0
1590 STA #84
1600 STA #70
1610 LDA #71
1620 CMP #13
1630 BEQ endline
1640 JMP compare
1650 \
1660 .match
1670 \
1680 INC #85
1690 LDY #85
1700 LDA #84
1710 STA #600,Y
1720 LDA #71
1730 CMP #13
1740 BEQ endline
1750 LDA #0
1760 STA #84
1770 STA #70
1780 JMP compare
1790 \
1800 .endline
1810 \

1820 LDA #85
1830 BNE display
1840 JMP check
1850 \
1860 .alldone
1870 \
1880 RTS
1890 \
1900 .display
1910 \
1920 LDA #81
1930 STA #82A
1940 LDA #82
1950 STA #82B
1960 JSR #9923
1970 \
1980 .dloop
1990 \
2000 LDA #1
2010 STA #76
2020 LDA #86
2030 LDY #89
2040 CMP #600,Y
2050 BEQ begin
2060 TAY
2070 LDA (#70),Y
2080 CMP #13
2090 BNE ptoken
2100 JMP gocheck
2110 \
2120 .ptoken
2130 \
2140 JSR #B50E
2150 LDY #77
2160 STA #700,Y
2170 INC #77
2180 INC #86
2190 JMP dloop
2200 \
2210 .find
2220 \
2230 LDA #640
2240 CMP #13
2250 BNE reprint
2260 JSR #FE00
2270 BCC reprint
2280 JMP escape
2290 \
2300 .reprint
2310 \
2320 JSR restore
2330 LDY #FF
2340 JSR dispir
2350 JMP incap
2360 \
2370 .begin
2380 \
2390 LDA #0

```


2400 STA &76	2980 BEQ ckckfin	3560 LDA &FFF	4140 \
2410 LDA &318	2990 LDY &40	3570 BIT &FF	4150 LDA idat,Y
2420 STA &87	3000 LDA &32	3580 BPL disdone	4160 JSR &FFEE
2430 LDA &319	3010 \	3590 \	4170 INY
2440 STA &88	3020 .spaces	3600 .escape	4180 CPY &4
2450 JSR inverse	3030 \	3610 \	4190 BNE iloop
2460 LDY &FF	3040 JSR &FFEE	3620 BRK	4200 RTS
2470 JSR dispfr	3050 DEY	3630 EQU 17	4210 \
2480 TYA	3060 CPY &0	3640 EQU 18	4220 .idat
2490 CLC	3070 BNE spaces	3650 EQU 13	4230 \
2500 ADC &86	3080 LDA &13	3660 EQU 7	4240 EQU 17
2510 STA &86	3090 JSR &FFEE	3670 EQU "Escape"	4250 EQU 0
2520 JSR normal	3100 LDY &77	3680 EQU 0	4260 EQU 17
2530 LDA &1	3110 LDA &13	3690 \	4270 EQU 129
2540 STA &76	3120 STA &780,Y	3700 .osword	4280 \
2550 LDA &640	3130 LDA &82	3710 \	4290 .ndat
2560 CMP &13	3140 STA &2A	3720 EQU 0	4300 \
2570 BEQ find	3150 LDA &83	3730 EQU 6	4310 EQU 17
2580 LDA &88	3160 STA &2B	3740 EQU 64	4320 EQU 1
2590 CMP &ASC*Y*	3170 LDY &1	3750 EQU 32	4330 EQU 17
2600 BEQ replace	3180 LDA (&73),Y	3760 EQU 128	4340 EQU 128
2610 JSR &FFEE	3190 STA &7B	3770 \	4350 \
2620 BCC notesc2	3200 INY	3780 .token	4360 .dispfr
2630 JMP escape	3210 LDA (&73),Y	3790 \	4370 \
2640 \	3220 STA &7A	3800 STA &37	4380 INY
2650 .notesc2	3230 LDA &81	3810 LDA &6	4390 LDA &600,Y
2660 \	3240 STA &2A	3820 STA &38	4400 CMP &13
2670 CMP &ASC*Y*	3250 LDA &82	3830 JSR &8951	4410 BEQ disdone
2680 BNE find	3260 STA &2B	3840 RTS	4420 JSR &B50E
2690 \	3270 LDY &0	3850 \	4430 LDA &76
2700 .replace	3280 JSR &BC8D	3860 .incprog	4440 BEQ dispfr
2710 \	3290 LDA &7A	3870 \	4450 LDA &600,Y
2720 JSR restore	3300 STA &2A	3880 CLC	4460 LDY &77
2730 JSR inverse	3310 LDA &7B	3890 LDA &73	4470 STA &780,X
2740 LDY &3F	3320 CMP &FF	3900 ADC &1	4480 INC &77
2750 JSR dispfr	3330 BEQ ckckfin	3910 STA &73	4490 JMP dispfr
2760 JSR normal	3340 STA &2B	3920 LDA &74	4500 \
2770 LDA &FF	3350 JSR &997B	3930 ADC &0	4510 .disdone
2780 BIT &FF	3360 SEC	3940 STA &74	4520 \
2790 BPL incap	3370 LDA &3D	3950 LDY &0	4530 RTS
2800 JMP escape	3380 SBC &3	3960 LDA (&73),Y	4540 \
2810 \	3390 STA &73	3970 RTS	4550 .restore
2820 .incap	3400 LDA &3E	3980 \	4560 \
2830 \	3410 SBC &0	3990 .inverse	4570 LDA &31
2840 SEC	3420 STA &74	4000 \	4580 JSR &FFEE
2850 LDA &89	3430 JMP check	4010 LDA &idat MOD &100	4590 LDA &87
2860 SBC &85	4440 \	4020 JMP storvar	4600 JSR &FFEE
2870 BCS noinc	3450 .ckckfin	4030 \	4610 LDA &88
2880 INC &89	3460 \	4040 .normal	4620 JSR &FFEE
2890 \	3470 JSR &FFE7	4050 \	4630 RTS
2900 .noinc	3480 JMP check	4060 LDA &ndat MOD &100	4640 \
2910 \	3490 \	4070 \	4650 NEXT
2920 JMP dloop	3500 .input	4080 .storvar	4660 OSCLI("SAVE FR "+STR
2930 \	3510 \	4090 \	+"START"+STR+"PX")
2940 .gocheck	3520 LDY &osword MOD &100	4100 STA iloop+1	
2950 \	3530 LDY &osword DIV &100	4110 LDY &0	
2960 LDA &640	3540 LDA &0	4120 \	
2970 CMP &13	3550 JSR &FFF1	4130 .iloop	

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MAKE IT A RED—OR BLUE, OR YELLOW— LETTER DAY

TREVOR ROBERTS
starts a new series
on Electron graphics

FOR a micro that's supposed to have 16 colours, the Electron's screen display is fairly drab when you switch on.

All you get when you type at the keyboard is white letters appearing on a black background.

Now inspired by the knowledge that although the Electron is in Mode 6 when you switch on there are several other modes available, you might want to try exploring these.

To change mode—and we'll deal with what that actually means later—you just type in MODE followed by the mode number you require and press Return.

There are seven different modes in all, ranging from Mode 0 to Mode 6 (the default mode). So by entering:

MODE 8

through to:

MODE 6

in turn we can explore each of their characteristics.

Again, it's a bit disappointing for those who want a bit of colour in their computing life. Although the appearance of the letters you type in and the number of characters per line and lines to a screen differ with each mode, the colours stay obstinately black and white. Or to be precise, white letters on a black background.

Figure 1 sums up the changes you can expect as you

travel from mode to mode.

As you can see from the text column of Figure 1, the number of lines of text you can display from top to bottom of the screen varies from mode to mode.

In Mode 1 there are 32 lines while in Mode 3 there are 25. In Mode 0 you can have a massive 80 characters on a line while in Modes 2 and 5 you can only have 20.

Now the second column of Figure 1 seems to indicate that some of the modes can have more than one colour. We're told that Modes 1 and 5 have four colours, while Mode 2 has sixteen. But if that's so, why, when we entered Mode 5 with:

MODE 5

did the letters appear in only black and white? What of the other two colours?

The answer is that the other two colours are there and

ready to be used, but we haven't told the Electron we want to use them. Until we do, we are stuck with the colours established by the default condition.

You probably understand what is meant by a default condition. If you don't, don't worry, because you meet them all the time.

When you switch on your Electron or press Break, the micro starts up in Mode 6 (25 lines, each capable of holding 40 characters).

It has to start up in one mode or another, and the mode that is chosen is Mode 6. If you want another mode you have to use a MODE command to get to it.

Hence the term default condition, it's the mode you get by default. If you want another you have to tell the micro.

It's the same with the colours available when you

enter a mode.

If you think about it, you only really need two, a foreground colour for the text and a background colour.

And the default colours picked by Acorn are black and white. The letters are white and the background black. These are the defaults.

If you want another pair of colours, such as black letters on a white background, or red letters on a yellow background, then you have to do something about it.

You have to change the default conditions so you get the shades of text and background that you want. And you do this using the COLOUR command.

Let's concentrate on Mode 5, which Figure 1 promises us has four colours and 32 lines of 20 rather chunky characters. Put the Electron into Mode 5 by entering:

MODE 5

and pressing Return.

As usual, the text is white on a black background. Now try entering:

COLOUR 1

and see what happens. Unless your Electron is very different from mine you should see that the prompt —>— is now red rather than white. Now try typing a few letters such as:

PRINT "It's a red letter day"

and you'll see now that the foreground or text colour is red.

So, when you're in Mode 5 the command COLOUR 1 ensures that any letters that appear on screen after the command are red. Now try the command:

COLOUR 2

and you'll see that the prompt on the next line is yellow. Further keyboard athletics should convince you that now the text colour is yellow.

A quick:

COLOUR 3

returns the Electron to producing white text on a black background.

The result of all this is that

Mode	Number of colours	Text		Memory used
		lines	char	
0	2	32	80	20k
1	4	32	40	20k
2	16	32	20	20k
3	2	25	80	16k
4	2	32	40	10k
5	4	32	20	10k
6	2	25	40	8k

Figure 1: Electron modes

From Page 51

now, unless you've cleared the screen or you've been so verbose that it's scrolled to make room for more text, you should have four colours on screen. They are white, red, yellow and black.

Lose one mark if you forgot about black. That's counted as a colour, even though it's a background colour. In fact you can get black text as you'll see – or rather not see – if you use:

COLOUR 0

The problem is that the black text merges into the black background, so you can't see what you're typing. Not a good idea!

The easy way out of this is to hit the Break key, which returns you to the default set-up, white text on a black background.

The drawback is that you're now in Mode 6, not Mode 5. Still:

MODE 5

will remedy that.

Now we've seen how to change the foreground or text colours you might want to have a go at changing the background too.

This is easy if you remember the numbers you used with COLOUR to alter the foreground. All you do is add 128 to these numbers and the background turns to that colour.

So assuming that you're back in Mode 5 in the default black and white, try:

COLOUR 129

The result is that you should

see a white prompt appear on small patch of red background. The new background colour is red and any letter printed on the screen will appear against a small patch of red. If you want the whole background to go to red just use CLS to clear the screen. Spectacular isn't it?

To get a yellow background you just use:

COLOUR 130

as 130 is 128+2. To get a white background:

COLOUR 131

is the command. However this isn't too bright an idea, as now you can't see the white letters against the white background.

Again, if you can't type in

should do the trick, while:

COLOUR 1:COLOUR 130:CLS

will provide red letters on a yellow background.

So we've four colours available in Mode 5 and the promise of Figure 1 has been fulfilled.

The colours are selected with a COLOUR command, each colour having a reference number.

Black is colour 0, red is 1, yellow is 2 and white is 3. Adding 128 to the number allows us to alter the background.

It seems simple and straightforward, and so it is. However there is more to the COLOUR command than meets the eye. The numbers

Can you get these colours? The answer is yes.

You can think of our familiar logical colour numbers as codes standing for colours.

When you enter Mode 5 the code number 0 stands for black, while 2 means yellow. Now this selection is one of the Electron's default conditions.

Although it's like that when you enter the mode it needn't be like that all the time. If you want, you could have code 0 referring to blue and code 3 referring to magenta, so:

COLOUR 0

would result in blue letters, while:

COLOUR 3

would give magenta text.

How we actually do that we'll leave to next time. The point to grasp is that the logical colours can be filled with other shades than the ones allocated by the Electron.

If you wished they could all be flashing yellow-blue, though that would be a bit silly.

If you have difficulty with the concept, just think of the logical colour numbers as being paint pots. When you enter Mode 5 you've got four of these paint pots numbered 0 to 3 that just happen to be filled with black, white, red and yellow paint.

You can change the paint in these pots if you want different colours, but you're only allowed four pots at one time.

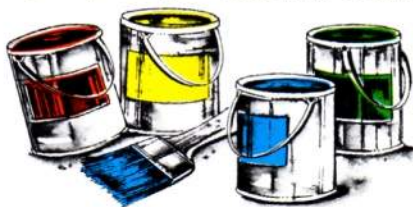
Figure 11 shows the four logical colours with their default colours, along with some of the colours that could actually be used.

For the moment, however, stick with the default colours allocated to the four logical colours we're given in Mode 5.

Try out different combinations of foreground and background colours until the COLOUR command gets to be second nature.

Next time we'll look at how to fill those pots with different paints – or, if you want to be formal, assign non-default actual colours to the logical colours.

We'll also look at some of the modes other than Mode 5.



commands that you can't see, the Break key should help.

As you've probably guessed, the command COLOUR 128 has the black background re-emerging.

With this mastery of the colour command in Mode 5 we can now get the foreground/background combinations we wished for earlier.

For black letters on a white background:

COLOUR 0:COLOUR 131:CLS

that we use to refer to the colours in our COLOUR commands are known as logical colour numbers.

So far the logical colour number 0 has referred to black, the logical colour number 1 has meant red and so on.

When you think about it, this is a bit limited. What if you wanted green or blue letters on a background of magenta, cyan or even on flashing blue-yellow?

		Flashing			
Colour	Logical colours				
		Black	Blue	Black-white	Blue-yellow
Colour 0	Black	Black	Blue	Black-white	Blue-yellow
Colour 1	Red	Red	Magenta	Red-cyan	Magenta-green
Colour 2	Yellow	Green	Cyan	Green-magenta	Cyan-red
Colour 3	White	Yellow	White	Yellow-blue	White-black
		Actual colours			

Figure 11: Mode 5, its default colours and the ones it could use

Micro Messages

I CANNOT get double height characters on my Electron.

I know that for the BBC Micro you only have to type in PRINT CHR\$(141) "Hello" and you get double height straight away.

So I would like to know how it is done in the easiest possible way. — **Girbinder Singh, Nottingham.**

Below is a program that will print double height characters in any mode.

Set the colour with COLOUR and the position with TAB.

```
10MODE 2
20PRINT
30PROCbio("Electron User
*)
40GOTO 40
50END
60DEF PROCbio(string$)
70LOCAL I%,A%
80FOR I%=1 TO LEN string$
90%70=A%(MID$(string$,
I%,1))
100A%=10:Y%=170:Y%=CALL
$FF:
110FOR J%=0 TO 1
120VDU 23,225
130FOR K%=2 TO 9
140VDU 7(180+K%J%K%20V)
150NEXT
160VDU 225,10,9
170NEXT
180VDU 11,11,9
190NEXT
200ENDPROC
```

Connecting joysticks

I HAVE an Electron and several MicroPower programs, Gorilla, Bandits at 3 o'clock, Croaker.

I wish to connect joysticks, but would also like to use the Plus 1 interface for printer and ROMs.

Is this compatible or will I have to buy a Plus 1 and also another joystick interface such as the First Byte one? Maybe

The way to make a big impression

there is another printer/joystick interface that is more suitable? — **A.D. Butcher, Romsey.**

● The Plus 1 is all that you require. Any analogue joysticks can be used with this.

Joyplus in the April 1985 issue of *Electron User* will convert nearly all of the early Micro Power games to work with the Plus 1 and analogue joysticks.

Cartridges for Plus 1

LAST summer I bought a Plus 1 unit for my Electron. At the same time I bought a pair of joysticks and the Hopper ROM cartridge.

I am still very pleased with my Plus 1 but the only problem is that other than Snapper and Countdown to Doom, I have not seen any other cartridges suitable for the Plus 1.

Is this because there aren't any or am I missing out on something?

If so could you please inform me what is available. — **Stuart Robinson, London.**

● There are quite a few ROM cartridges available for the Electron.

Acornsoft have produced Lisp, Logo, Pascal, View and Viewsheet.

ACP's ROM adaptors can be used to plug ROMs into the Plus 1 cartridge sockets. This means that you can make up your own ROM cartridges.

Micro magic

HAVING read yet another article about David Hamby and micro magic, I feel moved to correct your statements.

As far as I am aware I was

using a BBC B in my close-up magic act in 1983. This led to my programming the Paul Daniels Magic Show for Acornsoft, which has been on the market since last January for both BBC and Electron.

It contains 10 magical (rather than mathematics dressed up as magic) tricks. One even fooled Paul Daniels himself!

The pack is difficult to find, owing to Acornsoft's unerring way of advertising a product before Christmas but releasing it after the event. But I believe it's by far the best pack on the market, being programmed by a skilled programmer (I wrote most of the Acornsoft adventures) who is also a semi-professional magician.

Incidentally, I note that my *Philosopher's Quest* is No. 2 in your Top Ten adventures, for which many thanks. Acornsoft never told the public of the Electron versions, alas, also in true Acornsoft style. — **Peter D. Killworth, Oxford.**

View printer driver

IN the December issue of *Electron User* you asked whether anyone had used a View printer driver with the Electron. I have been using one for a while.

My setup is Electron, Plus 1, Plus 3, View and Epson LX-80 printer. I have sometimes used an FX-80 printer.

The printer driver from Watford for the FX-80 printer and BBC computer works perfectly well with the Electron, although it is a bit awkward at the start.

The printer driver I am using just now is one for the MX-80 and works perfectly.

If you can, get a tape

version of the printer driver, otherwise you will have to know someone with a BBC running View to transfer your driver to tape. — **David Climie, Glasgow.**

Plus 3 software

PLEASE would someone tell me how I can get my hands on some decent software for the Plus 3? I have just bought a Plus 3 but I can't find anyone that sells Electron software on disc.

Is this because software houses can't be bothered to transfer their programs to disc or isn't it possible?

Also Robert Sloan (December *Micro Messages*) doesn't need to use "JOY on Ghoul". Just use the built in joystick option when the first part has loaded. — **Andrew Dix, Ipswich.**

● Don't throw your tape software away. Sloggers T2P3 ROM will transfer most of your tape software to Plus 3 disc — protecting it at the same time.

As the number of Electron users with discs increases, so will the amount of software on disc.

Way out of the galaxy

WE have an Electron with Elite on cassette.

Despite having over 100,000 credits and an intergalactic hyperdrive, it is not possible to progress beyond Galaxy 1 following the instructions provided.

Could you please offer any

From Page 53

suggestions of how we may progress onto other galaxies? — **Mike Fleadrian, Gloucester.**

● Your problem arises from the fact that early versions of Elite have a bug.

If you look at Micro Messages for June 1985 in the *Electron User* you will find a way around this.

It also might be worth contacting Acornsoft to see if they will replace your copy.

Way into the dock

I'M having problems with Elite — I just can't dock.

It takes me half an hour to get the entrance port on the screen and then another quarter of an hour to get it any where near the proper position to dock! Can anyone help?

I am a first time adventurer. Can anyone recommend a reasonably priced, descriptive adventure game with a good vocabulary. My favourite games are Repton, Elite and Hopper. — **Ian Wright, aged 9, Chester.**

● You should find Sphinx Adventure is what you are looking for.

Our sister magazine *The Micro User*, featured an Elite player's guide in its January edition that should answer all your problems.

All the facts on *FX

IS there any way I can find out comprehensive information about the *FX codes, as the *User Guide* only glances over them? I am sure this is only the

tip of the iceberg. For example *FX200,2 clears memory when Break is pressed. — **F. Lawler, Radlett.**

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So

tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:

**Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.**

John Woolford's series on *FX calls covers them in more detail. This started in the July 1985 issue.

John Woolford's series on *FX calls covers them in more detail. This started in the July 1985 issue.

Show generosity

I BOUGHT a switched joystick and interface at the Electron & BBC Micro Show from Vulcan Electronics.

I then went around looking at various exhibits, but after I left and was walking back towards the Underground I noticed that I was only carrying one bag when I should have had two.

I ran back to the hall and went around asking the various officials if anyone had handed in a bag. None knew of anything being handed in. I then went back to the Vulcan stand to see if anyone had handed the bag into them as it had their logo on the side.

They said it hadn't been handed in but the guy on the stand said that he would take

the loss as theirs and handed me another joystick and interface.

So I am writing to say a public thank you to Vulcan Electronics, as I am very grateful for their generous action.

Also I would like to say thank you to Database for organising such a show where I could buy cut price hardware and software for my Electron.

I prefer the longer programs in the Electron User as they are well worth typing in. — **P. Johnson, Whitstable.**

● Thanks for the praise, and well done Vulcan. We've always believed our shows to be the most user friendly, and your experience proves it.

Our next show is at the New Horticultural Hall, Westminster, May 8 to 11.

Plus 3 and discs

I AM buying a Plus 3 expansion unit and I read in your magazine that the Plus-3 has an 80 track disc drive. But there are 40 and 80 track 3.5in blank discs.

Will the Plus 3 use both types of blank discs, when formatted?

If not, will it take Hewlett

Packard 3.5in single or double sided blank discs, when formatted? — **Jamieson Kirkhope, Wokingham.**

● The Plus 3 will format the disc 80 tracks, single sided using its own formatter.

It will not be able to read discs that have a different format to the ADFS, unfortunately.

Basic modes

I HAVE found a way of putting the Acorn Electron Basic sign into different modes.

All you have to do to put it into Mode 0 is type in:

***FX 255,107**

then press Break. To put it into Mode 1 type in:

***FX 255,108**

then press Break, and so on. — **Darren Butler, age 13, Brentwood.**

Software for handicapped

WE have recently obtained a grant to produce computer software for mentally handicapped people which will be the subject of a three-year project at the University of Keele.

We have just finished our first two pieces of software including the first ever computer arcade game aimed at mentally handicapped people, Mr Ugh.

We would be very interested to hear from anyone who has a similar interest or who would like to receive a copy of our free bulletin which is produced at regular intervals.

— **Rob Collins and John Hegarty, University of Keele, Keele, Staffordshire ST5 5GB.**

Colour galore

AFTER having read thoroughly my copy of Electron User I have seen in Micro Messages a young gentleman asking

Best buys in disc drives

THANK you for producing such excellent games. During the last couple of months they have picked up tremendously.

Games like *Dungeon Quest*, *Skramble*, *Ten 'N' Dan* and most of all a superb martial arts called *Karate Warrior* — great stuff, please keep it up.

Please include more music

programs as I like music on the Electron, especially short easy to write out programs.

I am thinking of getting a Cumana disc drive. Could you please tell me if the disc interface comes with the drive itself — **Nick Southgate, Upminster.**

● You'll have to buy a separate

interface when you get a Cumana disc drive. Unfortunately they don't come in a single package as standard.

Make sure the drive has its own power supply as it can't be run off the Electron's supply.

As for music programs, watch out for future issues.

how to get more than his quota of colour.

Although your short program gave a reasonable demo of "more colour", please give my program a try:

```
10C=4:MODE 2
20REPEAT
30GCOL C,I
40C=C+1
50MOVE 0,0
60MOVE 0,1024
70PLOT 85,640,512
80PLOT 85,1280,1024
90PLOT 85,1280,0
100MOVE 640,512
110PLOT 85,0,0
120UNTIL FALSE
```

This may prove addictive viewing, as it does for my two small sons.

You should leave it running for about five minutes. — Karl Obrien, Abram, Lancs.

Where's Frak?

I WAS wondering if there is an Electron version of Ardvark's Frak. I have been to all of the good computer stores but half of them have never heard of the game.

So please could you put me out of my misery and tell me if there is one? — Derek Irving, 12, Glasgow.

PS. Manic Mole is the best game that's ever been printed in a magazine. Keep up the good work!

● The day we received your letter we learnt of Frak's Electron debut!

Choice of ROM box

I OWN an Electron with Plus 1 and Plus 3. I am now considering buying a ROM box.

However I do not think I will ever need all the ROM sockets offered by the Slogger ROMbox. I was therefore thinking of buying the Advanced ROM Adaptor offered by ACP.

Will the ROM software offered by Slogger work with this product? — Stuart Murdoch, Edinburgh.

● ACP's ROM adaptor

I'M glad to see that Electron User has moved a little up market. Early issues tended to be a bit "comical", but recent articles and programs have shown your awareness that us tyros are becoming more discriminating.

Micro Messages is my favourite section, but I am surprised at the number of youngsters looking for ways to cheat at games.

Perhaps I should declare that I'm pushing 40 with two young children, and I certainly will not allow them to cheat.

After all, there is no sense of achievement unless you actually play the game to a

conclusion — even if you don't beat the current high score.

In a recent issue a young lady, namely Helen Williams, bemoaned the lack of Electron software in Gloucester shops.

This seems to come and go. Boots had quite a stock a few weeks ago, as did W.H. Smith.

Smiths seem to have lost interest recently, but there are still some good programs left in Boots.

She also liked typing in programs from the magazine. This is where I get most

pleasure from the machine, and in fact have yet to find one that fails to work.

This brings me to another point. There seems to be a lack of perseverance from some of your readers.

Complaints that programs do not work are in every case the result of insufficient care taken at the typing stage.

Come on out there, think about what you're doing and read the User Guide — it's there to help! — John Jamieson, Abbeydale, Gloucester.

provides a single ROM socket. Any ROM can be plugged into the adaptor, then plugged into the Plus 1.

All Electron ROMs work in either Slogger's ROMbox or ACP's adaptor.

See Micro Messages, January 1986, for a list of ROMs that work on the Electron.

Transferring software

AFTER reading your review of the Cumana Disc Interface I rushed out and bought it, and I can thoroughly recommend it.

It makes such a difference saving and loading at such speed.

However, there is one question I'd like to ask you. Where can I obtain disc versions of commercial software, or how do I transfer my cassette originals to disc?

I know you are going to give us the never-ending statements about copyright, but surely if someone has a cassette original they should be allowed to transfer it to disc? — Terry Newman, Norwich.

● As yet there is very little software on disc for the Electron. However, Slogger has a ROM which will transfer your software on tape to Cumana disc for you.

Non-starter

COULD you please tell me if it would be possible to use the motor racing game Revs on the Electron using the new Tube interface and a second processor?

If so could I use other BBC games on the Electron?

My final question is are there any alien items in Elite and if so which galaxy are they in? — David Ramsden, 13, Dewsbury.

● Revs is not available for the Electron and the BBC version will not work even with a second processor attached.

We don't think there are any alien items in the Electron version of Elite. Has anyone found any?

Quality games

WHO are these people who keep trying to tell us the Electron is dying? I would like to get my hands on them and shake the truth into them.

The people who say that software is of poor quality ought to look at games such as Magic Mushrooms, Repton I or II, Deathstar, Beach Head, Guardian, Zalaga, Mineshaft, Tempest, Hampstead and Terrormolinos to name but a few.

Also in regard to Dare Devil Denis and S. Whigham's letter in the December issue, it is possible to get past the policeman and the tree although it is very difficult.

I have only managed it once. To do so ride up to the policeman and jump between him and the tree. Split second timing is required.

It is good to see that the add-on range has increased with new support coming from ACP as well as increased support from Pace who have brought us that marvellous comms package. — D.P. Cumbers, St Ives, Cambs.

Killer stick

I TOOK advantage of your Beach Head offer in October's issue and the game has certainly lived up to my expectations — superb graphics, stunning sound and very hard to beat.

However, I have knocked out the fortress of Kuhn-Lin several times, making a best score of 109,600.

I can also recommend Tarzan Boy by Alligate. I can almost get on to the third screen but I keep getting killed by the walking stick type object that moves up and down the right hand side of the screen. Has anyone got past it? — Steven Talbott, Swavesey, Cambs.

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★ **Prestel/Micronet:** More than 300,000 pages of information, electronic magazines and special interest clubs, with news, advice and reviews. And there's a wealth of software just waiting to be downloaded directly into your Electron.

★ **Bulletin Boards:** News, views, software and specialist help - they're all available on the scores of home-brewed electronic notice boards that are springing up all over the country.

For many months we at *Electron User* have been looking for a communications package sophisticated enough to meet our exacting requirements.

Now at last it's here - the Tellstar/Nightingale combination.

The Pace Nightingale is a tried and tested, fully BT approved, multi-baud modem that plugs into a standard telephone socket.

Telstar complements it perfectly. It allows easy access to all the major electronic information providers, including MicroLink and Prestel, and while not available in full colour it contains all the other features expected of advanced communications software.

And of course, the package includes the necessary serial interface to link directly with your Electron via your Plus 1.

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This *Electron User* communications package includes the Pace Nightingale modem, RS423 interface and Tellstar software, FREE registration to MicroLink (worth £5), FREE quarter's subscription to Micronet (worth £10), and your chance to win a fabulous holiday in New York! (The Plus 1 is not included.)

Normal retail price: £160.95 (incl. VAT)

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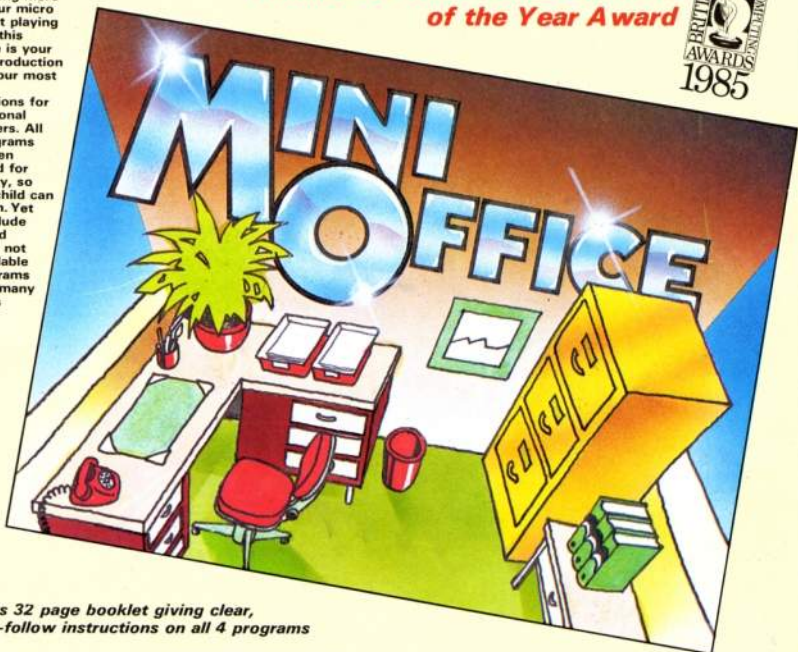
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On the February 1986 tape:

NECROMANCER Super hit action adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEIDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

On the January 1986 tape:

HELICOPTER RESCUE Pilot an air sea rescue helicopter. **MACHINE CODE** Detect collisions between sprites. **TAPEIDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

On the December 1985 tape:

GET SET SANTA Christmas fun collecting presents. **MISSILE TITBIT** Have your cities! **PROGRAM PROBE** Using joustics. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and carols for all. **DISC MENU** Disc Menu creator.

On the November 1985 tape:

KARATE WORM Electrifying combat. **ULA** Mode 6 Mode 7! **PAINT ROLLER** Colourful arcade action. **DEFUSE** Defuse the bombs. **SPRITE PRINT** Machine code graphics utility. **TRAIN** Far from stationary graphics.

On the October 1985 tape:

DUNGEON QUEST An amazing action arcade adventure. **PILOT** Computer assisted learning language. **RAVING ROLLER** Arcade action in the garden. **TRAIN** Animated action. **KALEIDOSCOPE** Colourful graphics action.

On the September 1985 tape:

TEXTAND A 3D Wild West shoot-out. **PINTCURSOR** Machine code graphics. **SPRITE/ED** Sprite editor. **COMPOSE** Winning simple amplified. **REVERSI** Cunning strategy game. **SIMPLEFIRE** Save and read data. **BOUNCE BALL** Two-way action. **ROTATE** Animation in a spin.

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DIGGA Exciting arcade action beneath the earth. **ODDGE THE ASTEROIDS** Fun deep in space among the asteroids. **M-CODE GRAPHICS** Sliding grid of text. **FX** The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXGRAM** An educational game to increase your word power.

On the July 1985 tape:

MANIC MOLE Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully coded TNT. **M-CODE GRAPHICS** Two demonstrations. **FX1/2** The OS on call. **PIRATE MATHS** Sum fun. **NOTEBOOK** Password Generator.

On the June 1985 tape:

QUASIMODO Baffling classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animated DOOS. **Race track action.** **STRINGALONG** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

On the May 1985 tape:

SKRAMBLE! Compulsive arcade action. **SHEEPNIM** The logic game.

TEXTWRITER Screen utility. LIFE

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On the April 1985 tape:

SUPER ARCHER Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILO** Guessing game. **NOTEBOOK** Hello to assembler.

On the March 1985 tape:

MR. FREEZE Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Fying bacon. **NOTEBOOK** Display formatting.

On the February 1985 tape:

CRASH A mystifying maze adventure. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE** A Binary/hexadecimal conversion utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time-keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

On the January 1985 tape:

SPACE BATTLE Destroy the deadly descending aliens! **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCAROG** Minefield action. **PIE CHART** Statistics made simple. **CLAYPIGION** An Electron birdshot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilian arcade action. **CHEESE** Race Beat rival race.

On the December 1984 tape:

CHRISTMAS BOX Align the presents logically. **SILLY SANTA** Sort out the middle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message tamed. **CAROL** Interrupted music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

On the November 1984 tape:

STAR FIGHTER Alien invasion missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level headed action. **CAESAR** Code breaking broken. **KEYBOARD** Typing game.

On the October 1984 tape:

BREAKFREE Classic arcade action. **ALPHASWAP** A logic game to strain your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTICHARACTER GENERATOR** Complex characters made simple. **RIGID** 8 Out of this world graphics. **MAYDAY** Help with your mouse code. **NOTEBOOK** Palindromes and string handling.

On the September 1984 tape:

HAUNTED HOUSE Arcade action in the spirit world. **SPLASH** A logic

game for non-swimmers. **SORT SHOWS** How sorting algorithms work. **SORT TIME** The time they take. **CLASSROOM INVADERS** Multicoloured characters go to school. **SAILOR** Nautical antics. **MATHS TEST** Try out your mental powers.

On the August 1984 tape:

SANDCASTLE The Electron assaults outting. **KNOCKOUT** Bouncing balls batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKES** Fendal goes comes to your Electron. **SCROLLER** Sliced strings slide sideways.

On the July 1984 tape:

GOLF A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 30 graphs. **FORMULAE** Areas, volumes and angles.

On the June 1984 tape:

MONEY MAZE Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men - the Electron way! **SETUP** Commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** A fast paced intergalactic shooting gallery.

On the May 1984 tape:

RALLY DRIVER High speed car control. **SPACE PODS** More aliens than a code. **CODE** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron thoughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save. **Electron masterpieces.**

On the April 1984 tape:

SPACEHIKE A hopping arcade classic. **FRIIZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESTERIM** Clock your moves. **STERIOD** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient world. **SUNNYBUTE** Easter program. **DOGDOCK** The classic logic game.

On the March 1984 tape:

CHICKEN Test your reflexes. **COFFEE** A tantalising word game. **PARKY'S PERIL** Parky's invisible car. **REACTION TIME** How fast are you? **BRAINTEASER** A puzzling program. **CHARACTER GENERATOR** Mental agility. **PAPER, SCISSORS, STONE** Out-guesses your Electron. **CHARACTER GENERATOR** Create shapes.

On the February 1984 tape:

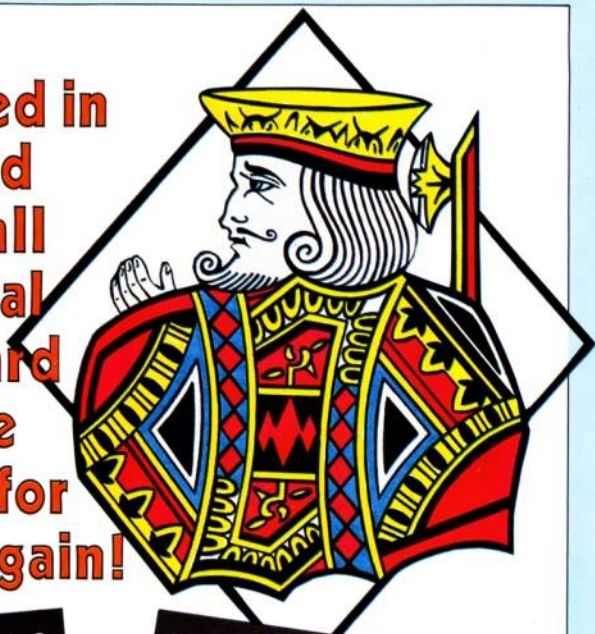
NUMBER BALANCE Mental arithmetic. **CALCULATOR** Use your Electron a calculator. **DOILIES** Patterns and games. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill. **POSITRON INVADERS** The old space favourite.

On the introductory tape:

ANAGRAM Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROGEO** World geography. **KALEIDOSCOPE** Electron graphics fun riot. **CAPITALS** New and old place letters. **ROCKET, WHEEL, CHANT** Three fireworks programs. **BOMBER** Drop the bombs before you're blown. **DUCK** Simple animation. **METERS** Collisions in space.



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